NATIONAL CAR BUILDER

VOLUME XI. NUMBER 4.

DEVOTED TO THE INTERESTS OF RAILWAY ROLLING STOCK.

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CONTENTS.

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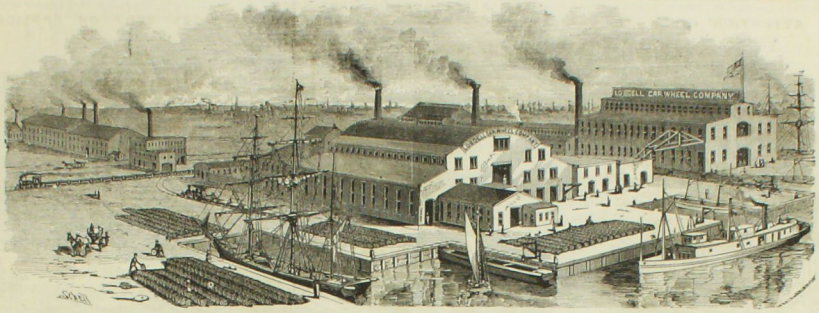

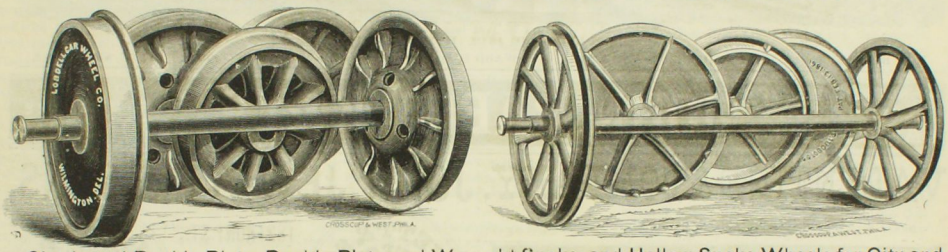

Single and Double Plate, Double Plate and Wrought Spoke, and Hollow Spoke Wheels for City and Steam Roads. Wheels with turned treads, under Patent of W. W. Lobdell, guaranteed to give greatly increased mileage over ordinary Chilled Wheels. Geo. G. Lobdell, *Pres't.* W. W. Lobdell, *Sec'y.* P. N. Brennan, *Treas.*

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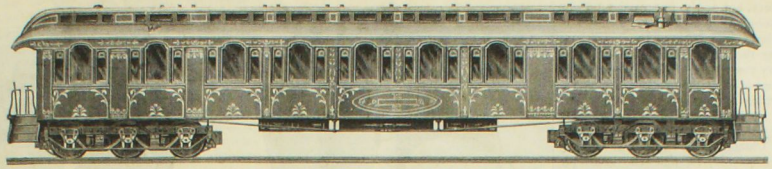
THE NATIONAL CAR-BUILDER.



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Miscellaneous Items.

THE Pullman Palace Car Co. is filling an order at the Detroit shops for the interior outfit and furnishing of a number of dining-room cars for the government railways in Australia.

THE Billmeyer & Smalls Company, of York, Pa., has secured a contract to furnish a Japanese railroad with cars, and it will be the first railroad in Japan equipped with American rolling stock.

THE Cleveland (O.) Bridge & Car Works have just finished 300 box cars for the Kansas Pacific, and 400 for the Cleveland, Columbus, Cincinnati & Indianapolis, and have contracts for 850 more.

THE Harlan & Hollingsworth Co., of Wilmington, Del., is running its car department to its full capacity upon orders from various railroads. About 1,100 men are employed in shipbuilding and car work.

THE Jackson & Sharp Co., Wilmington, Del., are running up to their full capacity, and turn out 20 freight cars per week and about 7 passenger coaches per month. They are now making iron work and trucks complete for a narrow-gauge road in Brazil.

THE Pullman Co.'s car-shops in Detroit have just turned out a very handsome sleeping-car for the Connecticut & Passumpsic Rivers road. They are now building 8 hotel cars, 10 narrow-gauge sleeping cars, 62 cars for the Metropolitan Elevated road in New York, and several passenger cars for the Wabash.

THE last of nine new postal cars has been turned out of the Union Pacific shops, providing an entirely new mail equipment on the main line of the road. These cars are reported to be models in every respect, being substantially built and very conveniently arranged for the postal clerks.

A RULE went into effect on the 1st of March, at the Patent Office, that hereafter no models will be required to accompany applications for patents, except in very intricate cases, where a drawing would not enable the examiners to decide a knotty point.

THE 22d of June has been fixed upon for narrowing the gauge of the Atlantic & Great Western. The requisite force will be in readiness and every preparation made, and then, at a certain hour, the work will begin simultaneously along the whole line, which is some 300 miles long.

THE increased demand for railroad locomotives on the Pennsylvania road has made it necessary to place three more engines on each track in the erection shop at Altoona, so that repairs can be made on eighteen engines at one time, instead of fourteen, as heretofore. An extra force of men has been employed by the company for the purpose of breaking up condemned locomotives.

THE Union Pacific is now receiving steel rails from three rolling-mills, which are kept at work all the time to supply the company. These rails are being used on the main line as fast as they are received, and the iron rails are taken up and laid down on the branches. The iron rails that are in bad condition are sent to the Laramie rolling-mills to be re-rolled.

CHICAGO now has, counting in the Wabash, which will be running trains into that city in a short time, twenty-one railroads, length in miles, 15,288. It is estimated that 272 trains arrive and depart every 24 hours, and that 44 railroads have offices in that city. Good for Chicago. The more spokes the bigger the hub.

THE Van Lieu grain-car doors have recently been put upon a large number of new cars on leading lines at the west, which, with contracts now being filled, make the whole number upward of 12,000.

MR. B. MULVEHILL has been appointed road master of the Cincinnati Southern, with headquarters at Chattanooga. He has been connected with the road for some years.

A LOCOMOTIVE on the Pennsylvania railroad made the fastest run on record a few evenings ago. It was ordered from the round-house to the scene of an accident, and ran 60 miles in 45 minutes and 8 seconds.

THE Harrisburg Car Manufacturing Company has orders from railroad companies in adjoining States for 1000 eight-wheel box cars. This will give steady employment to 900 or 1000 men for a period of at least three months.

THE Erie Car Works, at Erie, Pa., have increased their capacity to 16 cars per day, and have orders that will keep them busy until June. The capacity of the wheel foundry of Davenport, Fairbairn & Co. is also being increased in the same ratio.

THE Wagner Car Company has ordered 16 new sleeping cars. Twelve will be built by the Gilbert & Bush Co. and four by the Jackson & Sharp Co. The specifications require cars of large size, with a smoking room at the end of each. This compartment is separated wholly from the sleeping apartment, no passage being constructed through the partition between the smoking and sleeping room. The upper berths will be built in the drop-table style.

MR. JOHN L. GILL, JR., of the Pittsburg Car-Wheel Works, is preparing an apparatus for testing the strength of different screw-threads now in use. The tests will have the special object of determining the relative strength of the V thread with sharp edge, the United States standard thread, and the V thread, one-fourth, off, respectively. The testing machine is of the ordinary kind, and is provided with a micrometer and electrical attachments, so as to insure accuracy.

A MAN brought a suit for four shillings against the Metropolitan Railroad Company of London—the amount paid by him for a cab from Richmond—because the train on which he was riding stopped before it reached the Richmond station, and prevented his reaching a Southeastern Railroad train in time. The magistrate dismissed the case, on the ground that if the train hadn't stopped, there would have been a collision, and the plaintiff would probably have not been there to bring any suit at all.

THERE were no less than 53,000 tons of steel rails laid in 1879 on the Pennsylvania Railroad and the various lines under its control. In view of the fact that the price of these rails has advanced within a year from $40 to $80 per ton, the amount saved by the timely purchase of the quantity named, is a little more than $2,000,000.

THE employés of the Pennsylvania Railroad Co. are promised an increase of pay on the first day of April. Low freight rates and competition prevented any marked improvement in the business of the road until the close of 1879. The outlook for the current year, however, is brighter, and the result is higher wages for the rank and file. This is not only good policy on the part of the roads, but is simple justice to employés. We hear that similar movements are contemplated by a number of other railroad companies.

THE Moore Combination Desk Company, of Indianapolis, Ind., has recently made a shipment of its desks to Brazil, and also to the Michigan Central R. R. Co.

THE Northern Pacific railroad, in extending its line beyond the Missouri, has laid 60 miles of track the past season, graded 140 miles of roadway, and has provided for the completion of the line to the Yellowstone by September next. It has relaid its tracks from Brainerd to Fargo, 138 miles, and built nine freight-houses, while private parties have built grain-elevators and store-houses at sixteen stations. It has added to its rolling stock 10 locomotives and 100 cars, and contracted for 10 locomotives and 350 cars, for future delivery.

THE New York, New Haven & Hartford Railroad Company recently built at their shops in Hartford, 100 eight-wheel coal cars in five and a half days.

AN exchange says that at Montreal last week a locomotive crossed the river on the ice. We have no doubt of it. On one of the cold days in February we saw a locomotive and a whole train of cars cross a small river in New Jersey where the ice was quite thin. The entire train was made of tin, and was propelled by a six-year old boy.

The Pennsylvania Railroad Report.

The report of this great corporation for 1879, although many minor details of earnings and expenses are omitted, is a very clear and comprehensive document, and well deserves a careful examination. The general results of the year's operations are an evidence of the signal ability with which the property is managed, and the completeness of the organization by which the vast operations of the company are carried on. The increase in net earnings and in the volume of freight traffic, is not only an index of general

financial recovery, but of the improved condition of railroads throughout the country. In view of the fact that a large proportion of the business of the road during the year covered by the report was done at very low average freight rates, the increase in earnings is all the more satisfactory.

The gross earnings for the year of all the lines east and west of Pittsburg and Erie, including those worked by the Pennsylvania Company and the Pittsburg, Cincinnati & St. Louis Railway Company, were $60,362,575, and the gross expenses, excluding rentals, interest, dividends, etc., $35,639,794, leaving balance of net earnings, $24,722,780, being an increase of $2,906,851 over 1878. The increase in freight tonnage over that of 1878 is 9,143,192 tons, and in the number of passengers carried, 1,029,897.

The average gross earnings per ton per mile for transportation of freight on all the lines, was 0.824 cent; the average cost of transporting each ton one mile, 0.480 cent, and the average profit per ton per mile, 0.344. This is a slight reduction of net profit as compared with the previous year.

The average gross earnings from each passenger per mile was 2.255 cents; cost of transporting each passenger one mile 1.709 cents; and the average net profit per passenger per mile 0.546 cent. There were handled during the year 1,070,451 pieces of baggage, as against 972,008 pieces in 1878, and none of the pieces were lost.

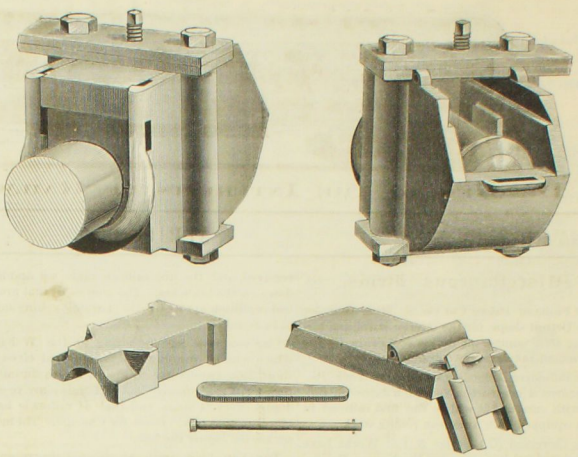
The increase in operating expenses on all lines over 1878, is $2,028,760, and is mainly in the motive power and transportation departments, and caused by the largely increased tonnage. There were used in renewals on the main line and branches, 6,923 tons of steel rails, and 509,843 ties; on the Philadelphia & Erie Division, 6,094 tons of steel rails and 143,671 ties; and on the New Jersey Division, 3,458 tons of steel rails and 276,957 ties. The total amount of steel rails laid on all the lines owned, controlled, or operated by the company, in 1879, was 53,272 tons.

The cost of operating the main line during the year, exclusive of branches, was 51.7 per cent. of the receipts; the main line alone of the New Jersey Division, 64.5 per cent.; and the Philadelphia & Erie, 68.9 per cent.

Car Report of the Atlantic & Great Western Railway, for 1879.

Mr. J. H. F. Wiers, the General Master Car-Builder of the road, makes the following statement of car mileage, cost of oil, repairs, etc., for the year 1879. Cost of repairs includes all renewals. The number of cars includes those leased from the U. S. Rolling Stock Co.

Average number of cars in passenger equipment.		121
" " " " freight "		3,395
Total average number of cars in passenger and freight service		3,516
Lubricating oil used on passenger train cars	52,577 qts.	
" " " freight " "	151,123 "	
Total	203,700 qts.	
Cost of lubricating oil for passenger train cars	$4,525.19	
" " " freight " "	7,606.97	
Total	$12,132.16	
Repairs of passenger cars	$66,677.42	
" freight "	220,492.37	
Total	$287,169.79	
Mileage of passenger train cars	5,460,601	
" freight " "	71,559,660	
Total mileage of cars in passenger and freight trains	77,020,261	
Miles run to pint of lubricating oil, by passenger train cars	51.93	
Miles run to pint of lubricating oil by freight train cars	236.76	
Average miles run to a pint of lubricating oil	189.05	
Cost of lubricating oil per mile, passenger train cars	0.083 cts.	
Cost of lubricating oil per mile, freight train cars.	0.010 "	
Average cost per mile	0.015 "	
Cost per mile for repairs, passenger cars	1.221 "	
" " " freight "	0.308 "	
Average cost per mile	0.372 "	



ROBINSON'S IMPROVED CAR JOURNAL BOX.

THE engravings illustrate an improved car journal box, of which the Robinson Car Box Company, of Columbus, Ohio, are the proprietors and manufacturers. The invention is a recent one, but has been sufficiently tested in actual service to establish its claim to several advantages over the most approved car journal boxes now in use. The peculiarities of its construction can be readily understood from the cuts, which represent a front and rear view, together with some of the subordinate parts detached. These consist of a slide which forms the top of box and box cover, the brass bearing, a taper wedge, and a pin for holding the slide in its place.

The most important advantage claimed is the ease and quickness with which a hot, worn, or defective brass may be removed from the journal without jacking up the car in the usual way. This is accomplished by introducing the taper wedge through the slots, as shown, in the back part of box and over the journal, the wedge when driven in doing the work of the jack by transferring the pressure from the brass and slide to the journal, so that the slide can be withdrawn and the brass taken out for inspection or renewal. The set-screw on top of the box is sometimes used to assist the wedge, but in most cases the wedge alone is sufficient. Although the screw is shown in the cut, it has been dispensed with altogether in the boxes recently made by the company, as it was found to be of little service in practical working, and liable also to some objections. In the case of a broken box, it can be slipped out by removing the iron bar underneath, and a new one put in, in a very short space of time; and in test cases, the brass bearings have been removed in half a minute after applying the wedge as above stated. The back of the box is made to fit closely to the journal, the space between them not exceeding $\frac{1}{16}$ of an inch, which excludes dirt and saves at least 50 per cent of the oil which is ordinarily wasted. It is claimed that the box will run, and keep out of the shop for repairs, three times as long as any other box in use. The jack can of course be used if preferred to the wedge, but even in such case the advantages of the slide top and economy in consumption of oil, remain.

Since the drawings for the cuts were received, the company have decided to dispense with the end collar on journal, and substitute a cap or wedge to prevent lateral motion. The box is said to be fully as strong as the master car-builders' standard, and is applicable to both freight and passenger trucks without change of pedestal or frame.

Of our own knowledge we can say nothing as to the merits of this alleged improvement; but from the evidence that has been placed in our hands as to its practical working upon a number of roads, we do not hesitate to recommend it to the attention of railroad men. As a sample of the many favorable things that are said of its performance, we are assured that two of the boxes have run 7,800 miles, with but two oilings, on a 23-ton engine tender of the Hocking Valley road. The box is also being put upon quite a number of new cars now in process of construction for different roads.

Any additional information may be obtained by addressing the proprietors and patentees, as above.

Job Shops and Slop Shops.

A writer in the Boston *Journal of Commerce* pictures the difference between a well organized job shop and what he terms a slop shop, as follows: The job shop is *sui generis*. While it partakes of the character of those adapted and intended for special productions, it has a character of its own not shared by any other. The various jobs and the frequent make-shifts tend to produce what would seem to the unpractical eye an appearance of disorder, and would convey such an impression, possibly, to the experienced mechanic, who might be unacquainted with the methods and system of that particular shop. But the well arranged job shop has an all-pervading character of order in the seeming disorder, and its workmen waste little time in preparing for emergencies, and are usually ready for any job that comes up.

The slop shop is exactly the reverse in character, and is never just ready for an unexpected job. Its apparent character is its true one. An outsider could just as readily find a missing tool or designate the hiding-place of a needed appliance as the proprietor, foreman, or any one of the workmen. The floor is rarely swept; when the *débris* of work accumulates too much on one spot, it is spread by a few hasty kicks, and all is serene. There are "glory-hole corners" which rarely are overhauled. There are hiding-places for spoiled jobs which are

inquired for by the vexed foreman, but rarely found. The shafting welcomes the visitor with a beseeching squeak, the repetition of which finds an echo in the chafing of a lathe belt on the cone. Some of the belts show angular gaps across their face, premonitions of sudden partings and tell-tales of neglect. The workmen are lavish with oil and waste, put new files on cast iron scale, toss a broken tool under the bench, and if they get hold of a decent tool, in decent order, chuck it into their private drawer or locked box. If a drill is wanted for a three-quarters of an inch hole, one sized to thirteen-sixteenth is taken and ground to size. Possibly half an hour after it has been transformed another workman needs it on work for thirteen-sixteenths holes. So the drill can never be kept in sets and sizes, and when account of stock is taken at the end of the year the proprietor wonders what has become of the sets of drills with which he started off so sanguinely and so hopefully the preceding January.

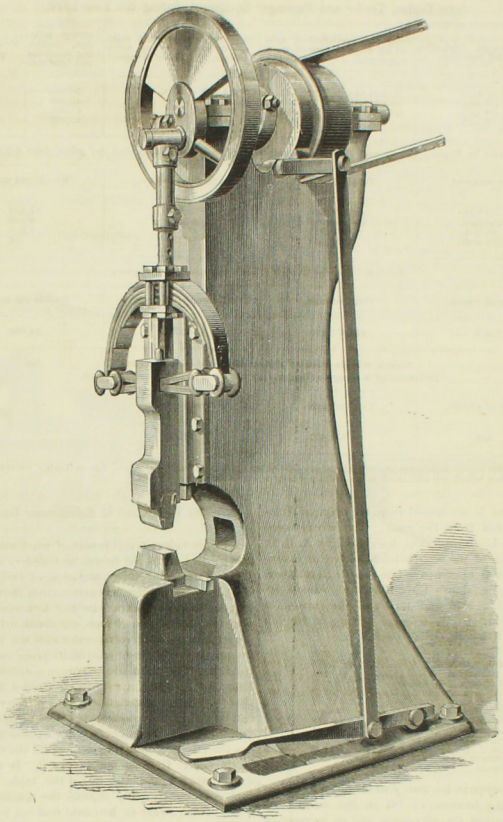
This is the general practice in the slop shop. There is no real head to the concern, there are no Mede and Persian rules of order, no sharp, overseeing eye, and no developed and vitalized system. A job that should be drilled under the upright drill is taken to the lathe because the former is in use, and a workman is put to a three hours' job of chipping and filing because another is using the planer. In this shop, there is manifested little readiness among the workmen to assist each other, except to help in turning the shop into a "hurrah nest." If one man knows more than another, he will hold on to his knowledge very much as a miser clings to his pennies. The foreman, possibly, gives instructions, but grudgingly or with an air of reproof. The slop shop is a good place to leave a job, but it is a poor place from which to get the completed work. The foreman will promise readily enough to-day, but his performance and day of redemption are indefinite.

There are plenty of these slop shops all over the country. It is singular to note that, although the proprietors invariably fail in business, there are about so many all the time; soon as one drops out another is anxious to show how little he knows about the management of a business, and the slop shop is probably a permanent institution.

Care of Boilers.

Those who have steam boilers in their care may profit by the following timely hints: Water gauges should be blown out frequently during the day, and the glasses and passages to the gauges kept clean. More accidents are due to inattention to water gauges than to all other causes put together. Safety valves should be tried at least once a day, to make sure that they will act freely. Overloading or neglect of these valves tends to the most disastrous results, and cannot be too carefully guarded against. Pressure gauges, where fitted with cocks, should be tried occasionally, by shutting off the steam and letting the pointer run back to zero. For this purpose, the cock to the gauge should be arranged to open to the atmosphere when shut off from the boiler. Blow-off cocks should be taken apart, examined and greased when the boiler is cleaned. Make certain that no water is escaping from the blow-off when the cock is supposed to be closed. Check valves or self-acting feed valves should be taken out and examined when the boiler is cleaned. Satisfy yourself frequently that the valve is acting when the feed pump is at work. Fusible plugs should be examined when the boiler is cleaned, and carefully scraped clean on both the water and fire sides. If this is not done, the plug will not act.—*Ex.*

THE Lobdell Car Wheel Company, at Wilmington, Del., is very busy, turning out 300 car-wheels a day.



JUSTICE'S DEAD STROKE POWER HAMMER.

THE cut represents a 100-pound power hammer, manufactured by Philip S. Justice, 14 North Fifth street, Philadelphia, Pa. This, and others of less and greater capacity constructed on the same principle, have already been extensively introduced in railroad shops and manufacturing establishments. The ram, or striking part of the machine, is suspended upon an elastic or flexible belt, usually of leather, which is attached to the ends of a semi-circular steel spring, by which means it is capable of striking a much more effective blow than any other hammer of the same weight and stroke. The special advantages claimed for this peculiarity of construction are, that the machine can be run at a high speed without danger of breaking; there being no valves, cylinders, or piston rods, repairs are necessarily light; the hammer invariably strikes a square true blow; it can be used on die work to better advantage than any other hammer in the market; is simple in construction, occupies but little room, requires but a small amount of power, and can be safely operated by any ordinary mechanic.

The upper part of the semi-circular spring is connected by a rod with a crank pin, and as the shaft revolves, the hammer descends with its full force, the rebound being taken up by the spring and flexible belt, so that the parts above are preserved from breakage. Except in hammers of 1000 pounds and upward, the anvil block base plate and frame are of one piece. The machine shown in the cut is adapted to general forgings and die work; weight of ram 100 lbs.; revolutions per minute, 200 to 250; horse-power required, 2 to 3; iron of 4 inches and under can be worked, and steel of half size. The machines made range in capacity from 15 lbs. to 2000 lbs. weight of ram. The proprietor has devised a new style of adjustable crank pin for regulating length of stroke on machines of 1000 lbs. and under; also a wrought-iron die bed on sizes of 100 lbs. and under, for holding the lower dies. These are not shown in the engraving.

The Laconia Car Co., of Laconia, N. H., has contracted to build 50 box cars for the Fitchburg Railroad, 30 for the Eastern, 25 for the Boston & Maine, and 50 for the Boston, Concord & Montreal roads. It has just finished two passenger and baggage cars for the Boston & Lowell, and is to build two first-class passenger cars for the same road.

Abstract of the Lake Shore & Michigan Southern Railway Report of Mileage made by Wheels removed from Engine, Tender and Passenger Equipment, during the Year 1879.

Wheels removed, including worn-out and defective.	Total mileage of all wheels removed.	Greatest mileage of worn-out wheels.	Least mileage of worn-out wheels.	Average mileage of worn-out wheels.	Average mileage, including worn-out and defective	New wheels put under.
1,710 (33 inch)	95,853,843	228,419	14,789	68,536	56,055	2,041
1,285 (30 inch)	58,864,801	178,379	20,213	55,133	45,809	1,258
390 (28 inch)	18,715,588	152,000	18,584	58,707	47,989	481
6 (20 inch)	275,674	48,387	44,725	45,946	45,946	8

Miles run by Engine, Tender and Passenger Equipment Wheels removed during five years, 1875-6-7-8-9.

Wheels removed.	Total mileage.	Average mileage.	Wheels put under.
8,694 (33 inch)	463,111,361	53,268	14,886
6,818 (30 inch)	276,634,083	40,574	8,109
1,483 (28 inch)	63,953,325	43,124	1,960
51 (20 inch)	2,282,453	44,754	54

Recapitulation of 33-inch Wheels worn out in five years.

Number of wheels.	Total mileage.	Average mileage.	Wheels put under.
6,694	413,557,170	59,130	14,886

33-inch Wheels reported flat by sliding, during 5 years.
Not included in foregoing because not the fault of iron or manufacture.

Number of wheels.	Total mileage.	Average mileage.
238	6,858,870	28,819

NOTE.—This report represents the minimum mileage, as no allowance has been made for switching, except in case of shifting engines, which are estimated at six miles per hour when in steam.

The above is condensed from the original statement received from the road. The wheels used are of three kinds or makes, designated by A. B. D. As the form of the reports made each year is uniform, it is easy to compare one year with another. The following shows the number of wheels removed during 1878 and 1879, and the causes for such removal; also the average mileage of 33-inch wheels for five consecutive years:

	1878.	1879.
Worn-out wheels removed	2,475	2,243
Broken tread and seams	181	330
Flat (bad chill or crumbling tread)	698	622
Sharp flange	223	106
Broken plate	1	6
Total No. wheels removed	3,578	3,301
New wheels put under	4,394	4,088
Average mileage of 6,720 33-in. wheels, 1874 to 1878 inclusive	57,702	.....
Average mileage of 6,994 33-in. wheels, 1875 to 1879 inclusive	.....	59,130

The difference in the two years is not very great, there being a decrease of 187 in the number of wheels removed for all causes, and an increase in the average mileage for five years. The record of the road shows the mileage of each wheel in the engine, tender and passenger equipment, the date when put under and when removed, and the cause of removal. No wheels are transferred from passenger to freight service. The object of this record, and the wearing out of wheels in passenger service, is to ascertain, on the basis of actual mileage, the merits of the wheels made by different manufacturers, and also whether each wheel makes its guaranteed mileage. A 33-inch wheel is considered "worn out" when it has run 50,000 miles, or when the chill is worn through in more than two places, although it may have run very much less than that distance. There are, of course, many exceptional wheels that make a much greater mileage than this before they are actually unfit for service, while many fail to make their guaranteed mileage, and many of these are removed for defects that are not the fault of the metal or the making, but are the results of ill-usage in one way or another.

Wallace & Sons' Brass and Copper Rolling Mills, New York, are furnishing many of the prominent railroads with copper tubes and sheet copper.

The Ventilation of Refrigerator Cars.

We give below a full report of what was said on this subject at the February Car-Builders' meeting:

Mr. Wicks said the ventilation of freight cars was an entirely different matter from that of ventilating passenger cars. In the latter case it was necessary to introduce pure air constantly to supply oxygen, but in refrigerator cars we find that the air is not changed essentially from its original condition, but it is made impure in a different way. Take, for instance, a car which carries beef, and that is about as severe a test as a refrigerator car can be put to. As soon as the beef is slaughtered decomposition commences. For a time it merely has the effect of changing somewhat the character of the beef. It does not injure it. It makes it more mature and better fit for the table. But, as that goes on, it really injures the quality of the flesh. Now, so far as he could find out by careful study of the subject, and by observation, the gases which arise from the beef are such as are soluble in water, and he found that moisture had very great effect in generating those gases. If you get rid of the moisture you get rid also of the gases, and your air then is in its original condition. He had made many careful experiments, and had observed large rooms where a great deal of animal matter had been held, and had seen the effect. In Boston, last year, a man fitted up all the floors of a store-house as a refrigerator, and he used a process which has been employed frequently for making ice. He used ammonia, and had a system of pipes in the shape of a large wheel, which revolved slowly with the motion of the engine. The air came in contact with the pipes and the moisture was frozen on the surface of the pipes. By a system of brushes the moisture was swept off, and the air as it went back was sweet. When he was there, four or five car-loads of beef which was spoiled arrived from Chicago, and the owner put it into these rooms so as to arrest decomposition, and thus try and get something for his beef. Two or three barrels of snow were collected by the pipes, and the odor of it was exceedingly offensive, but the decomposition of the beef was arrested by being in there, and the owner got something for his beef. That shows that the moisture holds the gases which arise from decomposed matter. The idea which he had always had in regard to refrigerator cars was that you should take advantage of the purifying quality which ice possesses, and use it as far as you can. In building an ordinary refrigerator room you can make a very good one if you have about 25 per cent. of the space devoted to ice. Then you get up a current of air, and as the warmer air passes along the ice, the moisture is condensed there and the room remains sweet. Now when you come to a refrigerator car, you cannot devote as much space to the ice. You can take only about one-tenth of the space, and you do not have enough ice to create a current of air which will affect the whole car. One-tenth of the space for ice is not sufficient. Generally, part of the ice is put in one end of the car and part in the other, and the idea which he had always had about it was that it is desirable to have an artificial current of air which will continually keep moving through the car, and in that way different impurities are gathered there and will be carried off as the air passes over the ice, because when the air gets into the coldest place the moisture that is in it condenses. There are a great many ways of building refrigerator cars. There are some that have the ice bunked up, and present a cold surface. That accomplishes the work thoroughly and well, so long as you can arrest the moisture and keep it on the cold surface, and prevent it from escaping again into the air. But the ice and salt must be continually renewed to produce that effect. But the simplest way is to have the ice exposed, and to take advantage of its purifying effect, because as the ice melts, it always presents a fresh, clean surface to the air as it comes in contact with it, and it will be found that the drip-water will taste of whatever impurity is in it.

Professor Trent said he had not had a very large amount of experience in this matter, but, in regard to ventilating cars, especially refrigerator cars, he thought the simplest way was to take into consideration the fact that moisture is the first element of decay, and to act upon that. If you take fruit, the first product of fermentation is moisture. Fermentation produces heat; heat and fermentation, decay. Now the easiest and the best method to get rid of that is to introduce the driest air you can get, and the purest. But there is no necessity for a large amount of machinery to ventilate a car, for the reason that if you have a closed space and you force air in it at one part, if there is an opening it must go out. If you make a bell or trumpet-mouth on top of a car, you will take in a large quantity of air when the motion of the car is forward. If that is brought down into the car it can be conducted all through it, no matter whether there is one crate of fruit in it or five hundred. If the fruit is too closely packed, by introducing small pipes at the tops of the crates the pressure of the air which enters through the trumpet, is sufficient to drive a current of air through every crate in the car, and out at the bottom. In order to get clean air, you must have a vessel containing clean water. You require very little ice. The fruit should be kept as near the temperature of the air as is possible, but it should be kept dry. If you have moisture, you will have fermentation; but if the air is dry, the fruit will remain sound. At Charleston they put in fruit—strawberries especially—in splendid condition. When they arrive in New York they are found to be in a mass. People say it is the shaking of the cars. Fermentation has taken place, and to prove it you will find that all the berries in the centre of the crate will be good. If you take meat, and put it into a dry room at a moderate temperature, you can keep it a very long time simply by keeping a current of dry air passing over it. If you have it too cold, the temperature of the meat will be lowered so much that it will

begin to decay of itself. By passing the air simply in a vessel of water, you first of all get rid of the dust and dirt that is carried in from the top of the car. Then, by carrying the pipe to the surface of the water, the pressure of the air on the water will cause the dust to go into it and settle at the bottom. He thought the same thing could be done with a passenger car. If that plan were adopted, he was certain that where they got one crate of perishable freights into the market to-day they would get fifty.

Mr. Wicks said that for a perfect refrigerator car for summer, outside air must be excluded. To bring air from 80 to 85 degrees into a car at about 40 would destroy the ice. He agreed with the gentleman perfectly in regard to carrying fruit, that it does not need a low temperature. You do not need there the use of ice so much as you do in carrying meats. That is an entirely different question, and must be handled in a different way.

taken, by an instantaneous adjustment, without stopping the machine. The machine will plane from $\frac{3}{8}$ of an inch to 12 inches thick.

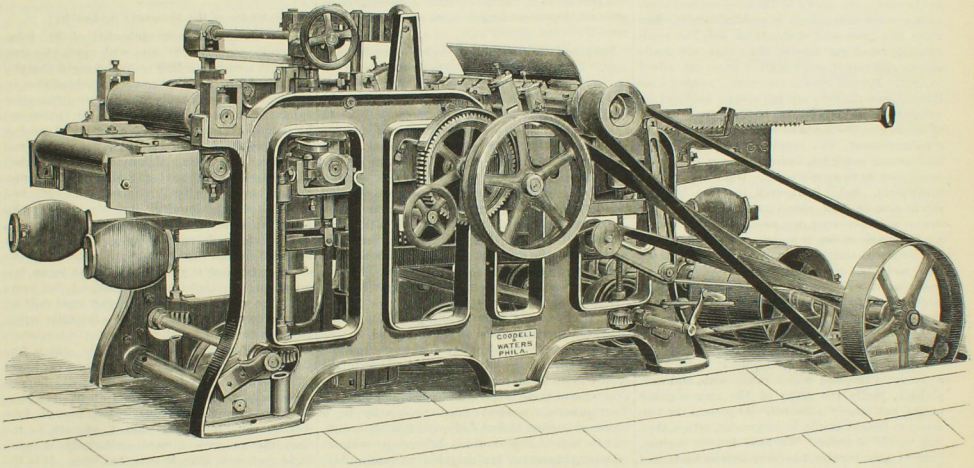
Manufactured by Goodell & Waters, Philadelphia, Pa., who, in addition to the machines of their own designing, are the owners of the patterns of the late firms of Power, Tainter & Co., and E. C. Tainter & Co., of the same city.

An English Writer on American Railway Cars.

An Englishman, Mr. Charles Waring, has written a book entitled "Some Things in America," in which he says:

"Having railed the northeastern and New England States, I am in a position to compare the railway traveling here with that of Europe, and I have come to the conclusion that, even in the Pullman parlor car, it is by no means equal to ours, either for speed, convenience, safety or comfort. As in everything else on the American side of the Atlantic, the workingman gets the best of it. His traveling is cheaper and more comfortable than what he gets with us. But the well-to-do fare badly, even in the parlor car, and where there is no parlor car they have to be content with such luxury as is supplied in common to them and to the coal-heaver. Accommodation at the stations is wofully deficient, and they are almost destitute of assistants to help or inform you. If there are any officers, owing to the uniform absence of uniforms, you never can find one. You must carry your own bundles and parcels, and make your own way across a labyrinth of lines and sidings, through a chessboard of moving engines and carriages, amid the clang of great bells, to your own carriage—if you can find it in time for the departure of the train, and if you can find out when that will take place. Once seated, you had better remain so till the end of your journey, for you cannot know how long the train will stop at any station, and it leaves without notice. The cars, too, are too large for comfort. Even in a republic it is not easy to get agreement as to heat or cold or ventilation amongst 50 occupants of the same car. It must be said, however, that whether you reach your destination or not, your luggage always does, and, generally, your effects meet with more consideration than your person at the hands of American railway managers." "The Americans," Mr. Waring says, in another passage, "are far ahead of us in labor saving appliances. They carry men and things better and cheaper than any nation. They seem to have solved the problem of transportation. You can travel on their river steamboats on regular four-post beds—not berths—and have a parlor to yourself if you like. You go to bed—not merely double up—in their railways, and you travel through their streets on the tops of their lamp posts. Some of the elevated railways in New York are literally constructed on each curbstone of the pavements on single wrought-iron posts."

This is a little contradictory. The writer evidently wanted to make out a case against Yankee railroad management, but forgot to make the concluding part of his criticism tally with the beginning. If the Americans have, as he says, "solved the problem of transportation, and can carry men and things better and cheaper than any other nation," we do not see what he has to complain of. There is, perhaps, a grain of truth in what he says about station accommodations, but his native prejudices get the better of his judgment when he asserts that well-to-do people on our roads have to share railway-car luxuries with coal-heavers. He magnifies into a rule what is merely incidental. Our cars, also, are too large for comfort, because fifty people who ride in them can't agree about heat and ventilation. Would a less number be more likely to agree? We have seen two persons sitting in the same seat of such different sensibilities as to air and temperature that what was agreeable to one was exceedingly disagreeable to the other. This trouble we imagine is not caused so much by the size of the cars as by the individual peculiarities of the occupants.



DOUBLE-SURFACING, ENDLESS-BED PLANER AND JOINTER.

THIS machine is designed to meet a want in car manufacture arising from the use of heavier timber, and also the necessity of working wood material more rapidly than can be done by the planing and surfacing machines now in use, in order to meet competition. This machine will double-surface 26 inches wide and over 12 inches thick, and will work four sides of a piece of timber 10 inches thick and 15 inches wide. In its construction it is extra heavy and strong, has a powerful and rapid feed, and planes the stuff equally smooth on both sides. The bed is raised and lowered by power, and held upon four large screws, thus having the firmness and durability of a solid-bed machine. The bed over the lower head is rigid and unyielding, though adjustable, and the yielding pressures, heavily weighted, are on each side of the head. These weighted pressures hold the stuff firmly against the upper bar or bed, thus ensuring perfect work. Another feature long desired and only reached by this arrangement is: if the stuff is scant in thickness, the lower head will not take off a cut; thus preventing imperfect work so often done on chattering boards. At the same time, the under head is under such easy and convenient control of the operator, that a heavy, light, or no cut, can be

The Central Vermont shops, at St. Albans, Vt., are building ten observation cars for the accommodation of excursion parties. Each car is 33 ft. long, and is fitted with twelve double seats, thus accommodating 48 persons. The side windows are without sash or glass, but have patent shade-roller curtains instead. The doors are on the side, and and move on a sliding scale.

The Wakefield Rattan Co., of Boston, is receiving large orders for its rattan seats for both steam and street cars, and also for its parlor-car chair with rattan seat.

Communications.

Cars for Suburban Traffic.

To the Editor of the National Car-Builder:

The Philadelphia, Wilmington & Baltimore Company, according to the statement of a Philadelphia paper, has decided to try the experiment of running frequent trains on its line some 10 or 12 miles out of Philadelphia, to be made up of light engines and light cars, built especially for this business. The expectation is that the increased accommodations and reduced fares which the company will give, will gradually build up the country along its line and induce settlement, bringing to the road eventually a large and very profitable traffic.

Now, it is no new proposition that better accommodations and lower fares will in the end largely increase suburban business, but the carrying of such business in light trains is a new experiment, the result of which will be watched with much interest. Suburban traffic as now managed, carried in the same cars, drawn by the same engines as are used on through trains is profitable only when there is a great deal of it. It is only the roads running out of our largest cities that are really able to cultivate it, and not all of them can afford to do it. For this reason, companies owning lines through new districts are not able to help and develop them as they ought, because they cannot afford to give the facilities which are needed to induce settlement, and people prefer the older line and perhaps much less desirable places, simply because they have more frequent train service and lower rates. But if it is proved that the business can be done by light, cheap trains as well as by the heavy, expensive ones now used, and that there is a considerable saving in so doing it, the new roads will be placed almost on an equality with the old ones, and there can be an extension of suburban traffic which will do much in smaller, as well as in larger cities, to prevent crowding and to promote that wider distribution of population which the best thinkers regard as so desirable both from a material and moral point of view.

The outcry for lighter rolling-stock, which arose a few years ago, and which came with, and was, perhaps, partly the cause of the narrow-gauge mania, has largely subsided. At present the tendency in freight traffic is to greater, rather than less, weight of trains. We have heavier engines, longer trains; cars built to carry heavier loads, and the general aim seems to be rather to increase the load which can be moved on a single train than to diminish the dead or non-paying weight necessary to carry that load. To some extent this has reacted upon the passenger rolling stock, and the tendency there also, though not so marked as with freight, is to longer trains and heavier cars. For through business this is perhaps necessary, and cannot be prevented, but for local, and especially for suburban business, it is, we believe, a very great mistake.

The primary object of a passenger car is to earn money for its owners, and to do this it must be adapted to the work it has to perform. The magnificent Pullman coach and the long, heavy passenger car with its costly upholstery have their proper place in railroad economy, but we do not think that place is on a suburban train. The merchant, the clerk or the mechanic who steps into the car for his half-hour's ride from Boston to Lynn, or Newton, or Medford, or Quincy; from Jersey City to Passaic, or Orange, or Elizabeth; from Chicago to Hyde Park, or Englewood, or Evanstown, cares very little for expensive upholstery or handsome head-linings or costly decorations. What he wants is a light, clean, cheerful car, with a reasonably comfortable seat, that will carry him to his home at a respectable rate of speed, and trains that will run often enough to avoid the necessity of tedious waiting at any time. Reasonable rates, and, above all, frequent train-service are what the suburban resident chiefly desires, and in comparison with these the ornamentation or upholstery of the cars are very minor considerations. We do not mean by this that cars should be too cheap or uncomfortable, but that much of the fancy work put upon cars now is wholly unnecessary for those run upon short-distance suburban trains.

It seems to us that cars for this service should not be too large. Shorter and smaller cars can not only be made lighter in proportion than a larger car, but they are often much more convenient in handling trains. A short car can often be added for the accommodation of a few additional passengers where it would be unadvisable or perhaps impossible to put on another heavy car, and with smaller cars the train could be adjusted more nearly to the work it has to do. And all suburban travelers will admit that in a small car one has a more cheerful and neighborly sort of feeling than is possible when lost in a large car among a troop of strangers. This may seem a minor consideration, and perhaps it is, but the comfort of passengers is, after all, dependent largely upon such small matters.

Suburban cars should be light, cheerful and airy. That good ventilation is necessary goes without saying; that is needed everywhere, though it is seldom enough that we get it. They should be well lighted at night, for your traveler likes to read his paper as he journeys homeward, and too often he cannot go there until after dark. The lights which too many companies provide are entirely insufficient. Too often the car is a dark, gloomy, cavernous-looking place, its two or three candles just making darkness visible; one enters it with a shrinking of spirits and leaves it with a sense of relief. Friends look strange and strangers repulsive, in the dim light, and any reference to a book or newspaper is out of the question. Abundant window-space, of course, gives light for the day-time, and it is surely not difficult now to find sufficient means of lighting at night, with all the improved appliances now at our command.

While upon this subject, we might refer to some smaller conveniences which our car-builders might supply to suburban travelers to their great satisfaction. One of these is space for baskets and bundles. Your suburban resident must necessarily be a bearer of burdens almost daily, and it is often difficult for him to dispose of his belongings without cramping himself or his neighbor uncomfortably. Another is a place to put *wet* umbrellas in. The dry umbrella can be disposed of in the racks overhead, but the *wet* umbrella, so often an unpleasant necessity in our climate, must be stood in a corner of the seat, where it dampens the clothing in an unpleasant and unhealthy way, and its drippings make the floor of the car wet and dirty. There are many other little conveniences which will readily suggest themselves, and which could be supplied at small expense.

It may be said that many of the questions we have here briefly referred to are for the consideration of managers and superintendents rather than car-builders, but, after all, if there is to be a reform in our methods of carrying suburban traffic, it will rest largely with our car-builders to carry it into execution. The car is the most important part of the passenger train. It is the part of the train which chiefly affects the traveler, and in the end the motive power must be adapted to the cars which are to be moved. Perhaps, too, it may greatly help the reform if car-builders can show their managers what can be done in this line, and can prove to them how cheap and how light a car well adapted to this business can be made. Old Stephen Whitney, well-known to the older generation of New Yorkers, had a clear perception of the value of comfortable cars; he was a conservative, but a clear-headed man, and he owned much real estate in New York. It is told of him that, at a meeting of directors of the New Jersey Railroad many years ago, when cars were but primitive affairs, some one proposed to put blinds or curtains to the car windows to keep out the sun. Mr. Whitney opposed it with all his might, for, said he "If you go and make your cars too comfortable, all these fellows on salaries will go and live over in Jersey; and then, where are your New York rents?"

The cars on the New York elevated roads, with all their defects, have furnished some indication of what can be done with light passenger cars for short runs. They are, after all, only a beginning to point the way to better things. What can really be done in this way we have not space to point out; but if what we have said will set some of our readers to thinking on this subject, our article will have fully accomplished its object.

H.

The Progress Toward Uniformity in Freight Car Construction.

To the Editor of the National Car-Builder:

I have read the communication of Mr. John Ortton in your March issue with much pleasure, and with a corresponding feeling of regret that the efforts of himself and other master car-builders in the interest of uniformity in car construction seem to have had so little practical result. Mr. Ortton and his earnest colleagues, however, must take comfort from the reflection that they have not worked and talked in vain, having already firmly established *some* standards that are being adopted, if not altogether, very generally throughout the length and breadth of this country, and also in Canada. It is some satisfaction that there is now a *struggle toward uniformity* and Mr. Ortton is a good enough Christian to understand that the *desire* to be good is generally followed by an improvement in man's moral nature. A few years ago there was no such desire; in fact some railroad companies purposely adhered to a peculiar equipment in order to avoid the ease of interchange which uniformity facilitates. It is only a few years ago when it was a rare thing for a car to get off its own road, and if such a thing did happen there was likely to be a row about it. Now all that is changed—*nous avons changé tout cela*, as the French say—and it appears to me that the progress toward uniformity is more rapid just now than it ever has been. It is the duty of master car-builders to point out to their General Managers the economical results to be obtained by the adoption of a certain kind of car, and if a standard cannot be adopted right off, it will be in time. As I said before, a good deal has been done in this direction already, and many ridiculous contrivances which have been affixed to cars have been killed off. A freight car, to be generally adopted, should have nothing complicated or extra expensive about it. It should have a rigid truck (no channel bar, swing motion, etc.), coil springs, the M. C. B. axle, box, brass and key, draw bar, etc.; a double board roof, a good grain door that cannot be carried off; in fact, a good strong car in all respects, but having no fancy attachments, some of which are of doubtful utility, and some cost more than they are worth. Such a car, 29 feet long, would probably weigh about 19,000 lbs., and carry 24,000 lbs. as a minimum load. There are many roads which would adopt a car of this description, but could not be induced to go in for channel-bar trucks, continuous draw-bars, iron roofs, 36-inch wheels, etc. I am in favor of light cars and light loads, and am of opinion that there will be strong discussions soon on some roads between the freight agents, car-builders and track engineers, as to the merits and demerits of heavy cars carrying loads of fifteen and twenty tons with a possible thirty. EGBERT.

The Street Railways of San Francisco and the Way they are Operated.

SAN FRANCISCO, Cal., March 15, 1880.

To the Editor of the National Car-Builder:

If New York City is noted for its elevated railroads, the same may be said of San Francisco with respect to its wire-rope railroads, which are a necessity in consequence of the hilly ground upon which a large part of the city is built. Market street is destined to be its great leading thoroughfare, beginning as it does at the Oakland ferry on the bay, and running in a southwesterly direction, it divides the city into two distinct sections, which differ very materially in their conformation. That portion south of Market street is quite level. On the northern side, however, with the exception of the high promontory called Telegraph Hill, and the business part lying between Kearney street and the bay, the surface is rolling and hilly, and here are the wire-rope railways. There are four of them—the California Street; Sutter Street; Geary Street, Park & Ocean; and Clay Street Hill. The latter being the pioneer, or first built, a description of it will serve for all; as they are constructed and operated substantially on the same principles.

The cars are of the usual street-car pattern, to each of which is attached a dummy. These dummies are open at the sides and ends, the roofs being supported by light pillars. There are seats at the front and sides, facing outward. The track of these roads is like that of ordinary street railways, except that between the rails is a slot which runs the entire length of the track. It is in and through this slot that the dummy is connected by a grip arrangement with the wire rope which runs about a foot below the surface of the street, and about two inches upon one side of the slot. At the corner of Leavensworth and Clay streets are the company's offices, and also the head-quarters of the superintendent, Mr. P. H. Campbell, who courteously conducted the writer into the engine-room under the street and explained the *modus operandi* of the road. The engine is 112 horse-power, but only a little more than a third of this is needed to perform the work. The cylinders are 14 × 28 inches, and work at the rate of 90 revolutions per minute. The steam is supplied by two boilers 15 feet long and 50 inches diameter. The periphery of the wheel which runs in contact with the wire cable has attached to it several hundred iron clasps which prevent the cable from slipping; holding it more firmly the harder the pressure, and letting go when the cable leaves the wheel. Any of the clasps can be renewed in case of breakage. The cable is 1 inch in diameter and 11,000 feet long, has a breaking strength of 40,000 lbs., and travels at the rate of five miles an hour.

The grip which connects the dummy with the cable is shaped like an L, except that the short limb is turned to the left. The top of the upright part is fastened to a tall vertical screw in the dummy. The lower side of the short limb contains the grip proper, which consists of two dies 2½ inches in length, and 1 inch in width and thickness, the sides of each forming arcs fitted to clasp the rope. There are two guide-wheels before and behind these dies, in which the rope runs when released from the grip. The upright screw in the dummy is composed of an inner and outer one, by means of which the grip can be elevated or depressed. The screws are worked by a horizontal wheel in the forward part of the dummy convenient for the operator. The grip being depressed by a few turns of the outer screw, the dies are in place above and on either side of the cable, and the guide-wheels receive it and keep it in position for the clasps or grip. A turn or two of the inner screw, and a connecting rod forces the grip to tighten on the moving rope, and dummy and car gradually start forward. Too sudden a tightening would cause a jerk; but the operator, after a little experience, can put a car in motion as gently as if he controlled it with the tip of his finger. When a car is to be stopped, a few upward turns of the inner screw remove the pressure of the grip; the rope falls into the upper edges of the guide-wheels, and the brakes are applied. At the end of the route the guide-wheels are separated and grip lifted clear of the cable by means of the outer screw, and the car and dummy are turned in the reverse direction on a turn-table. At each end of the route the cable passes around large horizontal wheels, set in solid masonry.

The Clay street Hill road has an average grade of 1 foot in 8.993, which is the steepest average. There are grades on the others as heavy as 1 to 6, and even 1 to 5.5; but these are exceptional, the average being less than the Clay street Hill.

In case the cable or grip should break, the result on these grades would be disastrous, were not special provision made for such a contingency. Besides the usual wheel brakes, the car and dummy are both furnished with powerful track brakes, and the engineer can in an instant raise the lower limb of the L so as to press heavily against the lower surface of the road-bed and underlying timbers. The highest elevation of the Clay street road above its lower starting point is 307 feet, that of the California street road, 265 feet, and the Sutter street, 141. Stoppages are only made at street crossings, where the road-bed is invariably on a level. At points where the grade changes, the cable is kept from rising and falling by means of pulley wheels, over or under which the cable passes, according to the inclination of the grade. There is obviously no trouble in passing *over* a pulley, but it may be asked how we get by a pulley *under* which the cable passes. When one of these depression pulleys, as they are called, is reached, the grip keeps its hold of the cable and depresses it sufficiently to clear the pulley, the short limb of the L passing underneath, and the cable rising again after the car has passed. The Clay street road has been in operation seven years, and is scarcely a mile in length, but has had an immense patronage. The other roads are each of them about 3 miles in length. Most of the rolling stock has been built here. Some of the cars were built at Schenectady, N. Y., and brought here at a cost of $250 each. In one instance these cable roads cross each other, and the reader may well inquire how the thing is managed. It *is* managed, however, and very successfully, but to describe it would involve too much mechanical detail, which, perhaps, could not be clearly understood without the aid of drawings.

Mr. A. E. Salter has succeeded to the business of the Kimball Manufacturing Company. The shops have been renovated, and the new proprietor expects soon to have the establishment in full operation. The Southern Pacific extension is to be completed to Tucson, Arizona, by the first of April. The Central Pacific Company are to build rolling mills at Sacramento near their present foundry, for the manufacture and rerolling of rails, and also for the making of iron bridge material.

AMICUS.

What is the Best Material for Box-Car Sills?

To the Editor of the National Car Builder:

I would like to know what the opinions of master car-builders are in regard to the best kind of material for the sills, intermediates and centers, of box-cars. I believe there is a prejudice in favor of oak for centers—Norway pine and Southern pine being considered good enough for outsides and intermediates only. Now as oak, especially for long lengths, is becoming scarcer every year, it would be well to know wherein its special supposed excellence for centers lies. For my part, I think Norway pine equally good in all respects, and so do others, as is evidenced by its being used in the contruction of hundreds of new cars monthly.

PAUL.

[The comparative suitability of the different kinds of hard timber for the purposes named by our correspondent is a subject that has received but little attention at the car-builders' meetings. White oak and yellow pine are at present, we believe, almost universally used for sills, but which of the two is to be preferred is not so clear. According to Prof. Thurston's scientific tests, both of these woods have great rigidity, strength, toughness and power to resist impact. White oak has less rigidity or yielding capacity than many other woods, but is exceedingly tough and resilient, yielding slowly until it suddenly gives way. Its lateral cohesion and the interlacing of its tenacious fibres give it a great power of resistance—greater, perhaps, than that of the best Southern pine. We hope some of the car-builders will favor us with their opinions on the subject.—EDITOR CAR-BUILDER.]

Car and Locomotive Report of Missouri, Kansas & Texas Railway for 1879.

CAR DEPARTMENT.

	Passenger.	Freight.
Mileage of trains	844,046	1,550,261
Mileage of cars	4,109,412	26,048,778
Average number of cars per train	4.70	16.40
Cost of repairs per train mile	8.21 cts.	9.28 cts.
Cost of repairs per car mile	1.49 cts.	0.55 cts.
Total cost of repairs	$69,290.17	$144,476.96
Mileage of Pullman cars	575,422	
Cost of Pullman car repairs per mile	1.29 cts.	
Total cost Pullman car repairs	$7,433.46	

The freight-car mileage is of loaded cars, three empty cars being rated as two loaded ones. The total cost of car repairs for the year was $213,776.13.

LOCOMOTIVE DEPARTMENT.

Number of engines, 82. Number of miles operated, 807.

Freight train engines	1,550,145	19.15
Passenger " "	863,475	13.88
Work " "	165,540	15.54
Switch " "	331,324	9.71
Total	2,910,484	Average..16.31

Average miles per ton of coal	38.48
" " " quart oil, lubricating	31.98
" " " all kinds	23.53
" " " pounds of waste	135.65

Cost per mile run:

	Rep'rs.	Wages.	Stores.	Fuel.	Total.
Freight train engines	5.19	6.87	0.45	6.64	19.15
Passenger " "	4.06	5.85	0.44	3.53	13.88
Work " "	6.32	6 38	0.29	2.55	15.54
Switch " "	2.31	5.43	0.27	1.70	9.71
Total	4.60	6.38	0.41	4.92	16.31

Average cost per mile for water supply and fuel stations	1.00
Grand total cost per mile (all expenses here included)	17.31

Revenue train engines are allowed card miles only. Work train engines are allowed 8 miles per hour, when in use. Switch engines are allowed 6 miles per hour, when in use.

Loaded car statement, expenses of all engines included:

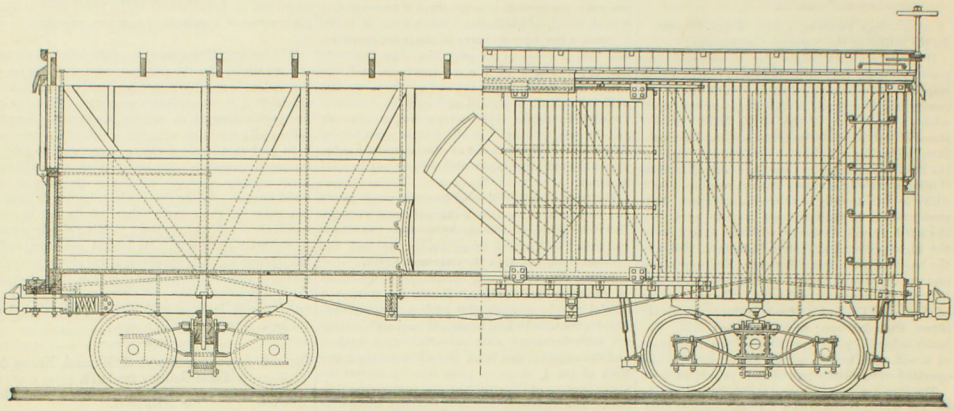
	Cost per car.	Average cars hauled one mile per ton of fuel.	Cars per train.	Revenue engines. Cost per car mile.
Freight	1.33	472	16.4	1.17
Passenger	3.36	243	4.7	2.95

Average No. of revenue engines employed during year	64.17
Average No. of miles run by revenue engines during year	30,054
Average No. of work train engines employed during year	4.83
Average No. of switch engines employed during year	10.83

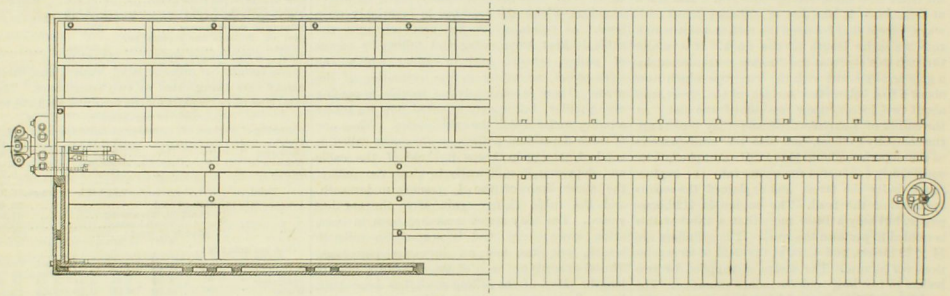
GEO. W. CUSHING, Supt. of Machinery.

A DECISION has been rendered in the U. S. Circuit Court for the Southern District of New York, in the case of Nathan & Dreyfus, proprietors of the Gresham patent for a supplementary jet-lifting apparatus for injectors, *vs.* the N. Y. Elevated R. R. and W. L. Chase, for infringement. The infringement is known as the "Little Giant" injector, made and sold by the La Rue Manufacturing Co., of Philadelphia. The court sustained the patent, and granted an injunction and an accounting for damages. The plaintiffs now give notice that lifting injectors of this pattern are infringements and announce that they will settle on reasonable terms with all users who respond promptly, and without litigation.

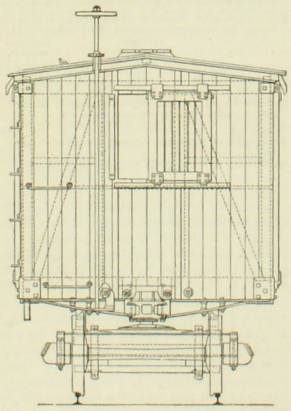
STANDARD GRAIN AND MERCHANDISE CAR—CHICAGO, BURLINGTON & QUINCY RAILROAD.



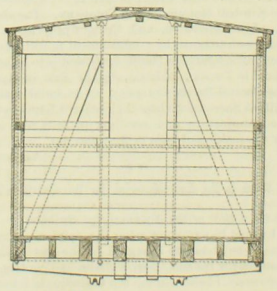
Sectional and Side Elevation.



Floor Frame and Roof.



End Elevation.



Transverse Section.

THE drawings represent a side elevation and section, end elevation, transverse section, and plan of framing and roof, of Standard Grain and Merchandise Car of the Chicago, Burlington & Quincy Railroad.

Below we give specifications showing details of construction; also statement of materials used, by which the cost of any car of similar construction can be correctly estimated on the basis of present prices of materials; also a statement of the cost in detail of a grain and merchandise car built by the road in 1879, according to the specifications herewith appended. Although the cost is based on the low prices which prevailed in the early part of last year, a comparison of the cost of the various items at that time can easily be made with the cost of the same items now, and the difference ascertained with approximate correctness.

GENERAL DIMENSIONS.

Length of body out to out of sills	28 ft.
Width " " " " " "	8 " 9 in.
Height, top of sill to top of plate	7 " 1 "
Side Door openings	5 "
End Door "	2 "

BODY TIMBERS.

	No. Pieces.
Stringers, hard pine, 5 × 9 in. × 28 ft. long	6
Side Plates, hard pine, 3 × 6 in. × 28 ft. long	2
Center Rib, hard pine, 2¼ × 3½ in. × 28 ft. long	1

Intermediate Ribs, hard pine, 1¾ × 2½ in. × 28 ft. long..... 4
Side Mouldings, hard pine, 1¾ × 3¾ in. × 29 ft. long..... 2
End Mouldings, hard pine, 1¾ × 3¾ in. × 10 ft. long..... 2
Running Board, hard pine, 2 × 6 in. × 14 ft. long. 1
" " " " 2 × 6 in. × 16 ft. long. 1
" " " " 1 × 6 in. × 14 ft. long. 2
Water Caps, hard pine, 1¼ × 9 in. × 18 ft. long... 2
Outside Ceiling, hard pine, ¾ × 6 in. × 16 ft. long. 1
Inside " " ¾ × 6 in. × 12 ft. long.86
" " " ¾ × 6 in. × 16 ft. long.30
Flooring, hard pine, 1⅜ × 8 in. × 18 ft. long.....21
Roofing, hard pine, ⅜ × 6 in. × 4 ft. 9 in. long...240
Doors, ash, 1¾ stuff—90 lineal feet.....—
Brake Beam, elm, 3½ × 6 in. × 5 ft. 9 in. long 2
End Sills, oak, 5 × 9 in. × 8 ft. 9 in. long..... 2
Cross Ties, oak, 4 × 8 in. × 8 ft. 9 in. long..... 2
Draw Timbers, oak, 4½ × 7½ in. × 8 ft. long..... 4
Dead Woods, oak, 6 × 7½ in. × 2 ft. long..... 2
Side and End Door Posts, oak, 3½ × 4¼ in. × 8 ft. long..... 8
Corner Posts, oak, 3¾ × 4¼ in. × 6 ft. 10½ in. long..... 4
Side Posts, oak, 2½ × 3½ in. × 6 ft. 10½ in. long. 8
Braces, oak, 2½ × 3½ in. × 8 ft. long.....16
End Girts, oak, 3½ × 3½ in. × 2 ft. 2 in. long..... 2
Caps at Ends, oak, 2¼ × 3⅝ in. × 3 ft. 4 in. long.. 4
Caps at Sides, oak, 2¼ × 3⅝ in. × 12 ft. long..... 4
Carlines, oak, 1¾ × 10 in. × 8 ft. 9 in. long.....10
Floor support on cross ties, oak, 1¾ × 8 in. × 6 ft. 9 in. long..... 2
Door Stops, oak, 2¼ × 3 in. × 8 ft. long..... 2
Ladder Posts, oak, 1¾ × 2½ in. × 7 ft. long..... 2
To fasten Brake, oak, 1¾ × 3 in. × 2 ft. 6 in. long. 1
End Plates, oak, 2½ × 13 in. × 8 ft. 9 in. long 2

TRUCK TIMBERS.

Swing Beam, oak, 9 × 9 in. × 5 ft. 2 in. long..... 2
Sand Plank, oak, 2½ × 9 in. × 5 ft. 2 in. long..... 2

CONSTRUCTION.

Side Sills.—Framed with double tenons 1½ in. thick, with 2½ in. space between them; must have a relish of 2 in. upon the outside, and be secured to end sills by 13 in. joint bolts.

Intermediate and Center Sills.—Tenons 5 in. wide, and of same size and spacing as those on side sills; center sills secured to end sills by ¾ in. joint bolts which pass through dead wood. The intermediate sills have no joint bolts.

Transoms.—Of double plate wrought iron ¾ × 6 in., extending from out to out of side sills; center of transoms 4 ft. 8 in. from out of end sills, secure to car by ¾ in. bolts, one through each sill, and provide with standard center plates and side bearings.

Cross Ties.—To be placed 6 ft. apart in the clear, in center of body under the sills, gained out ½ in. deep to receive the sills, to which they are fastened by ⅝ in. bolts. Saddle castings of standard pattern as shown.

Draw Timbers.—Each bolted to center sills with five ⅝ in. bolts; 2 cast-iron keys in joint of draw timber and sill let in half and half in each. A strap of wrought-iron 3 × ⅜ × 17 in. long is bolted under draw timber at outer end, and let in flush with bottom of timber for draw bar to rest on.

Truss Rods.—Two in number, of 1 in. round iron with 1¼ in. upset ends, located immediately inside of intermediate sills; rest on cast-iron saddles on top of transoms 8½ in. high, and on saddle castings under cross-ties; joined in center of car by ¾ in. bolt.

Posts and Braces.—Tenons each end 1 in. thick, and 1 in. long, and of same width as posts or braces; mortises of corresponding size and 1 in. from outside of sill or plate. All posts to have ⅝ rods with screw threads at their ends, let into side of post flush, passing through sill and plate with nuts and washers. Corner posts to be strengthened in addition by a ⅝ rod passing through them and across end of car, with nuts and washers on theoutside; also by a rod of same size from corner post to first side posts.

Door Posts.—To have a lip from bottom of sill to top of plate, of same width as post, and ¼ in. thicker than siding of car, screwed to sill and plate.

Girts or Caps.—These are 4 ft. from top of sills and project ¾ in. beyond face of posts and braces toward inside of car so as to be flush with inside of ceiling.

End Plates.—Tenons 1 in. thick and long, with 1⅛ in. space between, and 1¼ in. below lower tenon, to be relished on outside, leaving tenons 1⅛ in. wide; secured to side plates by ⅝ in. joint bolts which pass through and secure the sheet iron corner plate.

Rafters.—Ten ; to be framed without tenons, and resting simply on top of plates, notched down on same ¾ in. and secured to plates by two 20d. nails in each end.

Purlines.—These are let in to end plates and rafters, as shown; there are 2 on each side and one in center, fastened by 12 d. nails.

Roof.—Double board road standard; boards 1 × 6 in. and 4 ft. 9 in. long dressed and grooved, fastened to purlines and side moulding by 3 in. No. 16 wood screws—8 screws to each board of upper course. Paint : one coat Parker's Cement or Prince's Mineral in oil between courses, and two heavy coats of same on top; last coat to be sanded.

Running Boards.—One 2 × 6 in. in center, and one 1 × 6 in. on each side, with 1 in. space between.

Floor.—Hard pine 1⅜ × 8 in. matched and grooved and nailed with 20d. cut nails, 2 to each sill.

Siding.—To be of ¾ in. clear pine, matched and beaded, fastened with 8d. wrought nails in plates and sills, and 6d. in girts. No nails to be put in braces.

Inside Ceiling.—To be of ¾ in. hard pine, second clear, dressed and matched and secured with 6d. cut nails. To prevent grain from working under ceiling by shrinkage of boards, a strip of inch stuff is nailed on the floor between posts flush with inside face of same.

Band Moulding.—To be of 2 × 3½ in. pine fastened by 30d. cut nails.

Side Doors.—To have 5 feet openings between posts, and full height between floor and plate; 1¾ in. ash frames with ¾ in. ceiling; wrought iron handles, hasps, staples and bolts on chain; also 4 slide castings to work on wrought iron slides.

End Doors.—To have 2 feet openings, and to be 3 ft. high from bottom of plate down.

Weather Boards.—To be made of 1¾ in. stuff and reach from out to out of door posts, and down to top of door.

Grain Doors.—Bissell & Miller pattern; the side ones to be 37 in. high from floor, and the end ones 18 in. high.

Grain Lines.—To be marked as follows : Wheat 30½ in. from top of floor, orange color; corn 33½ in. green; oats 58 in., mineral.

Trucks.—Thielsen's channel bar, 33 in. wheels, 3½ × 6 journals, axles 6 ft. 8¾ in. total length, wheel seat 4½ in., and center 4 in. Wheels warranted to make 4 years time, or 50,000 miles, aside from accidents or flat spots from sliding. Oil box, road standard with Hewitt cover.

Brakes.—Beams 4 × 6 elm, ¾ in. hangers and 1⅜ in. safety chains; shoes Congdon's patent; top of staff not to exceed 11 in. above running board.

Painting.—Body to have two coats of Parker's Cement Paint or Prince's Mineral in oil, and lettered according to specifications.

MATERIAL FOR CAR BODY.

Pine stringers, plates and sills	969 feet
Roofing	609 "
Flooring	600 "
Siding and Ceiling	1191 "
Common Pine	200 "
Oak for sills, plates, cross ties, draw timbers, etc	1000 "
Ash for door frames, etc	100 "
Elm for brake beams	30 "
Wrought Iron	1760 lbs.
Cast Iron	1243 "
Nuts	90 "
Washers	18 "
Lag Screws	15 "
Nails	91 "
Wood Screws 2½ No. 16	10 grs
Carriage Bolts ⅝ × 2½	74 only
Coal	190 lbs.
Buffer Springs	2 only

MATERIAL FOR TRUCKS.

Wrought Iron	2838 lbs.
Cast Iron (including wheels)	4992 "

Specification for building Box Freight Cars, for the Chicago, Burlington & Quincy Railroad.

1. *Frames* will include sills, cross girts, posts, braces, ceiling girts, framing for quarter doors and hog-slides, end sills and side plates, carlines, ribs or purlines, transoms with all castings to receive trucks, king-bolts, bolts and truss rods—all put up and material for same.

2. *Floors* will include flooring, threshold and king-bolt plates, put down and all material for same.

3. *Roofs* will include roof boards and running boards, put up, and all material for same.

4. *Outside Siding*, including sheathing boards, cornices, water caps, door stops, and wrought iron corner plates, put up, and material for same.

5. *Inside Ceiling*, put up and material for same.

6. *Trusses* will include truss rods, saddles on transoms also cross ties, end washers and nuts, put up, and material for same.

7. *Draw Bars* will include draw bar timbers, dead woods, springs, draw bar castings, jaw castings, and cast-iron keys between draw timbers and sills, bolts, plates and straps, coupling links and pins, put up and material for same.

8. *Brakes*, including beams, shoes, wheels, top bearing, step, ratchet, dog, shaft, chains, lever, hangers and guards ready to put up, and all material for same.

9. *Doors* will include all outside doors, and racks, if any, also grain doors, cattle bars, quarter doors and hog-slides, if any, ready to put up, and all material for same.

10. *Trimmings* will include door hasps and staples, door slides and brackets, grain door circles, eye bolts, ladder steps, locks and seals and small chain, all ready to put up.

11. *Outside Fitting* will include hanging doors and brakes, putting up ladder steps, locks, seals, and all small fittings.

12. *Trucks* will include these complete, with center pin ready on truck, and all material for same.

13. *Painting* will include all material and labor for painting roof body and trucks, also putting in grain lines, lettering, numbering and stenciling.

Statement of Cost of 1 Standard Grain and Merchandise Car of Chicago, Burlington & Quincy Railroad, built in 1879 :

	Material.	Labor.	Total.
1. Frame	$52.85	$6.79	$59.64
2. Floor	10.76	1.12	11.88
3. Roof	25.49	3.34	28.83
4. Siding (outside)	22.70	4.04	26.74
5. Siding (inside)	5.08	.83	5.91
6. Trusses	5.80	1.13	6.93
7. Draw Bars	26.08	2.95	29.03
8. Brakes	7.33	2.16	9.49
9. Doors	9.00	2.71	11.71
10. Trimmings	13.29	1.38	14.67
11. Outside fittings		4.85	4.85
12. Trucks	227.82	12.12	239.94
13. Painting	5.25	2.16	7.41
Total	$410.54	$45.58	$456.12

Statement of Cost of 1 Standard Stock Car of Chicago, Burlington & Quincy Railroad, built in 1879 :

	Material.	Labor.	Total.
1. Frame	$52.78	$6.59	$59.37
2. Floor	10.91	1.12	12.03
3. Roof	22.74	3.34	26.08
4. Siding (outside)	3.88	1.41	5.29
5. Siding (inside)	6.05	.93	6.98
6. Trusses	4.89	1.13	6.02
7. Draw Bars	20.08	2.95	29.03
8. Brakes	7.33	2.16	9.49
9. Doors	7.93	1.92	9.85
10. Trimmings	12.96	1.43	14.39
11. Outside fittings		4.42	4.42
12. Trucks	227.92	12.12	240.04
13. Painting	5.25	2.16	7.41
Total	$388.72	$42.68	$431.40

An Improved Live-Stock Car.

The Nova Scotia Society for the Prevention of Cruelty to Animals calls attention to an improved live-stock car invented by Thomas Clarke, of Truro, N. S., and which is described substantially as follows:

"It is so constructed that horses, cattle, sheep and pigs can be carried at the same time, keeping each kind of animals separate as well as providing a feed-bin capable of containing at least five days' feed and three days' water for each stall or pen. A separate water tap is provided for each animal or pen of hogs or sheep and the car can be washed out in a few minutes without removing or in any way disturbing the animals. If the car is filled with horses or large cattle, each animal has a separate stall and also a separate feed or water trough, or if the car be filled with sheep or hogs the car is divided into pens of four feet square, and each pen has both feed and water troughs. The animals are separated by partitions that are connected or unhitched in a moment. Each animal is tied with a sliding ring and chain, from each side of the neck, so that the animal can raise and lower its head with perfect freedom, but cannot turn round. When the car is being emptied of its living freight, as each animal passes out, the partition and head stall folds completely, thereby offering no obstruction to the animal whose turn comes next. The car being empty, it can be washed out in a few minutes by the use of a hose attached to the water tank; and if it is desired to use the car for carrying other freight than live stock, in ten minutes everything can be removed, thus leaving four bare walls, and, to all intents and purposes, an ordinary freight car, without a single obstruction. The bottom of the car is so arranged that the spillings from the animals run from the car, or, if the car is washed, no water can lodge on the floor. The train can proceed without loss of time to its destination, and no stoppage is necessary as far as the comfort of the animals is concerned; thus a train of cattle may be shipped at San Francisco and delivered in New York or Halifax, with only one stoppage for taking in feed, which would not exceed one hour.

"With this car, a shipper puts cattle on board and puts his own feed into the bins, and sends one man to attend to a whole train of twenty cars. Unless the journey occupies more than five or six days, the animals will reach the end of the journey before the feed is consumed. There is no waste of feed, no torturing of the animals; but instead of having to be taken out of the car every twenty-four hours and fed in a snow-bank or mud heap, and then driven back by means of sticks, spears, and whips for another twenty-four hours run, the animals are just as comfortable as if in a clean and well-ventilated barn, except that they have not quite so much room, but they can lie down with as much ease at least as on board ship."

If this car, which, according to the circular of the above named society, exists as yet only in the form of a model, should be generally adopted by railway companies, the inventor would not only pocket a nice sum in the shape of patent royalties, but would be entitled to the $5,000 prize offered by the American Humane Society, at its meeting in Chicago last fall, for a stock car so constructed that animals can lie down and rest and be fed and watered during transit without unloading. While the humane instincts of these societies are worthy of all praise, the majority of their members have not, we suspect, studied the problem of live-stock transportation very deeply. There is certainly no difficulty in designing or building cars for carrying cattle in the way proposed. It is a mere question of floor space

and the number of animals put into such space. If no more cattle are to be put in a car than can conveniently lie down in it, the cost of transporting them will of course be very much greater than it now is. These excellent people seem to suppose that if animals can only lie down and be fed and watered in the cars, they can travel thousands of miles without stopping or being unloaded, when the fact is that the feeding, watering and resting, to be of any service to the animals, must be done outside of the cars; and as for the animals standing on their feet, it is not for the interest of shippers that they should do so for more than 30 hours consecutively, because it would injure them.

There can be no question, however, that a great deal of misery is inflicted upon live stock while in transit on our roads; but in the absence of specific legal regulations, it is, we fear, one of those necessary evils which admits of but little alleviation.

The Lighting of Cars.

The question of a sufficient and economical light for railway cars is one upon which a vast amount of thought and labor has been expended. Unfortunately for the traveling public, comparatively little has been done to solve the problem in a satisfactory way. We have an abundance of safe lights, but they are not brilliant enough to satisfy any one who wishes to read. We might have more lights by filling the roofs of our cars with lamps, but the cost and annoyance of lamps is too great. Lastly, gas is proposed, but it would seem that the cost not only of the gas itself, but of the plant necessary for its introduction, is too heavy to permit of its general use.

In the discussion of the best methods of lighting cars, we must not only consider the means of producing light, but the best methods of utilizing the light after it is produced. The amount of light needed in an ordinary railway-car at night is variously estimated. Some managers consider that if it is sufficient to allow of persons being distinctly seen all over the car, there is light enough. We know of several roads where this standard is adopted for suburban trains. Of course, in a car with no more illumination than this, it is impossible for those, even in the most-favored positions, to see to read when the train is in motion. On some roads there is an attempt made to do more, and to enable those who are sitting directly under the lamps to read a newspaper having fairly good type and printing, like the New York *Times* for example. This is practically the most liberal amount of light that is found on any of the roads. Under such circumstances, from twelve to fourteen persons in each car are able to read.

The amount of light really wanted in a car is enough to enable all the passengers, except, perhaps, those in the end seats, to read. Of course, we all know that reading in the cars is a bad habit, and should not be indulged in ; but the public is not comfortable when deprived of the ability to read, and it is, therefore, bad policy on the part of the railway man to deny the privilege by providing an insufficient light. Want of light is the most seriously felt on those trains which carry business and working men to and from their places of business. Any inconveniences which they find on these trips tend to keep the population in the city, which is directly against the interests of the railway companies.

It is in the mind of a great many car-builders an open question whether it is possible at any reasonable expense to give the amount of illumination which we have spoken of as essential. Even on roads where gas is used, there are but few cars in which a newspaper can be read at night, except in those seats on each side of the burner, where the light is the brightest. The reason for this, and for the lack of light in many of our best cars, which are well provided with lamps, is found in the amount of light absorbed by the wood-work and fittings of the car.

Within the past dozen years, the style of decorating the interior of our finer cars has entirely changed. Fine woods are lavishly used, and the whole finish of the inside is cabinet work of the finest description. The natural woods, although beautiful in the day time, are usually very dark. Old mahogany, so highly prized by all lovers of old furniture, and so beautiful in car-work, at night appears almost black. The result of this is that the interior of a car is nearly as hard to light as if it was lined with black cloth. Probably more than 40 per cent. of the light of the car lamps is actually wasted. To render this a little worse, the head linings are usually of such tones as to reflect very little lamp-light, while the break caused by the raised roof and the dark shadows of its finish, add to the general gloom.

To avoid this dark and dismal appearance at night, some builders are using a large quantity of light-colored woods, such as white maple and holly. This is, no doubt, a very great improvement. It must be kept in mind, however, that even maple is dark as compared with the white walls of our houses, and when it has been exposed to the light under even the whitest varnish, it becomes still darker. None of the light woods retain their color for any length of time. They turn under the varnish and by the action of light.

It is apparent to every one who examines the subject closely, that by a moderate reform in respect to the finish of cars a vast economy of light can be effected. It is worth considering whether for cars which are to be used for the local traffic, of which we have spoken, cannot be finished by painting the inside. To be effective, such a finish must be done with great skill. The old-fashioned house-painters' work employed years ago in cars will not answer. It must be something fine and light. To be successful, it should be applied to all portions of the raised roof and the panels, down as low as the top of the seats. The head-lining should also have its due share of attention, and be designed with especial reference to lightness at night. To show off to the best advantage, the finish should be designed with especial reference to the needs of the painter.

This may perhaps be called the first method of increasing the light in our railway cars. While it will greatly increase the amount of light obtained and make the cars much more cheerful at night, it will by no means solve all the questions involved in the subject of car illumination. It is a hint, however, which should receive very careful consideration, especially by those who, hindered by adverse legislation, are kept from making other improvements in their lighting arrangements.

PRESIDENT SCOTT, of the Pennsylvania Railroad, calls attention in his annual report to the fact that the system of pooling adopted by various competing lines, has resulted in carrying the great through traffic of the country at regular and moderate prices, instead of subjecting the public to exorbitant and unreasonable rates, as was apprehended by many. He also directs attention to the fact that the charge per ton per mile made by his own road in 1879, was less than the low figures of the preceding year, showing that the railways look to a large tonnage and small profits for revenue on the capital invested. In view of this, he deprecates hasty and inconsiderate legislation such as has been proposed in Congress, and which would only have the effect of legalizing the worst forms of discrimination, not only as between shippers and different localities, but also against the local traffic of the country.

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EDITORIAL ANNOUNCEMENTS.

Subscription.—ONE DOLLAR *a year in advance, postage prepaid. One copy will be sent free for one year to any person sending us five new subscribers.*

Addresses.—*Business letters should be addressed, and drafts and money orders made payable, to* THE NATIONAL CAR-BUILDER. *Communications for the attention of the Editor should be addressed* EDITOR NATIONAL CAR-BUILDER.

Advertisements.—*Nothing will be inserted in this journal for pay,* EXCEPT IN THE ADVERTISING COLUMNS. *The editorial department will contain our own views and opinions; and the rest of the reading matter, aside from advertisements, will be such as we consider of interest to our readers.*

Contributions.—*Articles relating to railway rolling stock construction and management, and kindred topics, by those who are practically acquainted with these subjects, are especially desired. Also early notice of changes in railroad officers, organizations and names of companies.*

Special Notice.—*As the* CAR-BUILDER *is printed and ready for mailing on the last day of the month, advertisements, correspondence, etc., intended for insertion, must be received not later than the 25th day of the month.*

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A COMMITTEE has been organized in Detroit to make suitable arrangements for entertaining the members of the Master Car-Builders' Association at their June meeting in that city. It having been stated that there might be a scarcity of hotel accommodations, the committee desires to say that there will be no lack of rooms if three times the usual number were to attend the convention. One hotel has already offered to furnish rooms for all who come. It is expected that the meetings will be held in the Council Chamber of the City Hall, a few yards from the Russell House, which is the first hotel in the city.

STANDARDS.

The necessity of establishing and adhering to certain standards in car construction and in the appliances incidental thereto is becoming more urgent every day. It is something inseparable from the growth and development of the railroad system. A vast network of roads becoming every year more interlaced, inter-dependent and homogeneous, running into consolidations and alliances in order to facilitate the movement of the great currents of traffic, cannot be worked to advantage if there is too much friction in the rolling stock or delay in the handling of it. This sort of thing must be kept at a minimum, and a constantly decreasing one at that. Every railroad manager cannot fail to see the vast saving in operating expenses that would result from a uniformity of construction, not only by such lines as are by their connections merged into a system as distinguished from other connected lines, but by all the roads in the country irrespective of sectional divisions. The

exigencies and demands of traffic are independent of state lines or geographical boundaries. A railroad car, and especially a freight car, is no longer a local fixture, as it once was, wearing itself out on the home line, but goes every where, and has become in a certain sense the common property of all the lines between the two oceans.

Now, upon all these lines of road there are practically no established standards of any thing save width of track gauge, and even that is not altogether complete. All the wider gauges are being reduced to this standard from sheer necessity, and to avoid isolation and a loss of business. It is only a question of time, and a very short time, too, when there will be a uniform gauge everywhere upon all lines of road of any importance. This will, of course, increase the interchange of cars as well as consolidations of ownership and management, and also to a corresponding extent increase the need of other standards besides width of gauge. At present there is plenty of standards, so-called, for almost everything belonging to a car, and even the car itself. But they are mere local standards of this, that, or the other road, adopted last year perhaps, and liable to be changed or give place to new ones next year or the year after. A real standard, as everybody knows, is something quite different from this, and must be different if it is expected to be worth much in railroad practice. It is that which is established as a rule or model by authority or general consent. It must be general and not local, or the term loses its significance. A standard coin, weight or lineal measure, that should be valid only in the shops and on the line of the Pennsylvania railroad, would not be much of a standard for all the other roads.

Great as the necessity is for a more general uniformity in the parts of cars that are liable to frequent renewal, and as much as a uniformity in screw-threads and height of draw-bars is needed, we have no idea that these things will be accomplished merely by talking and writing about them. It is a question of dollars and cents, of profit and loss to the roads, and these considerations will ultimately override all others. The tendency is in the right direction, and the obstacles, great as they seem to be at present, will gradually yield to the demands of self-interest. The first efficient steps must be taken by some one or more of the great consolidated lines, with the encouragement and approval of the managers, and whatever is adopted under their auspices will not easily be changed even for something that may be better. The accruing advantages will extend to their connections, and although other trunk lines may adhere to their own local standards, they can only do so to advantage so long as their earnings are not sensibly affected as compared with those of their rivals. Impelled by the urgency of the case, a movement has recently been made by four of the so-called Vanderbilt lines with a view to the construction of a certain number of freight cars, comprising one of each class, which shall hereafter be considered as standards in all their respective details. The mere announcement of this movement, if we may judge from the allusions to it by our correspondents, has attracted the attention of managers and car-builders of many other roads, who are anxious to see the drawings and specifications. We hope these will in due time be forthcoming, so we can present them to the readers of the CAR-BUILDER.

The only objection that can reasonably be urged against an adherence to rigid standards in general or detailed construction is, that it would prevent the adoption of manifest improvements. It would not do to assume that such standards are absolutely perfect, but so long as they are universally adhered to it is obvious that the great saving in time, material, labor and dead stock, would go far to compensate for any benefits that might be sacrificed from not adopting new inventions. In this connection we may state that in Germany the railroads adopted some years ago a code of technical regulations relating to the dimensions of cars, size of wheels, axles, wheel-base, springs, buffers, etc., and this code is conformed to as an obligatory rule —has the force of law, in fact, and is not left to the discretion of the companies, as mere parties to an agreement. So far as such regulations are fixed and unchangeable, they operate of course as a barrier to progressive improvement; but to obviate this, they are subject to periodical revision, the object being to secure substantial uniformity, at least for the time being. This is what we are professedly trying to accomplish in this country, but so far with indifferent success, for the reason that the agitation of the subject has been left to the voluntary action of a multitude of independent companies, with no impelling inducement except the somewhat discordant suggestions of the individual heads of the mechanical departments.

AVERAGE COST OF TRANSPORTING FREIGHT.

One of the most difficult problems in the science of railroad transportation is the right division of expenses between freight and passenger service. To determine the relative proportion of these expenses with anything like accuracy is manifestly impossible, the reason being that for a very large percentage of the aggregate cost of operation, there is no basis except an arbitrary one for making a division. There are of course a great many items that belong so exclusively to one or the other of the two branches of traffic, that they can be charged directly to the proper account. So far there is no difficulty. But with respect to maintenance of way, salaries, telegraphing, taxes, switching service, office and legal expenses, and a host of other things, no division can be made except upon the basis of mileage, or approximately. Such a division is better than none, and if all roads would adopt the same methods so far as the nature of the traffic permits, the cost of transporting a ton or a passenger per mile upon each, could be ascertained with sufficient accuracy for making comparisons as between one road and another. When the Pennsylvania Railroad Company reports the average cost upon all its lines of carrying a ton of freight one mile, to be 0.545, 0.615, and 0.480 of a cent for the years 1877, '78 and '79 respectively, the showing, if it is approximately correct, is not only of great service to the road, but is sure to attract the attention of managers of other lines who are unable to report so low a figure. The causes of the difference, especially if it is large, will be looked after and analyzed with a good deal of care in order to satisfy stockholders and owners that their road is in competent hands.

We have not at hand the reported estimates of other leading lines for the past year, but for previous years the New York Central, Erie, Boston & Albany, and Lake Shore, ranged from 0.59 to 0.75 of a cent average cost per ton per mile, while a few other roads, such as the New York & New Haven, and Rome, Watertown & Ogdensburg, went as high as 2.15 and 2.28 cents. Assuming that these results are arrived at from a common basis of calculation, the marked difference can be accounted for by taking into consideration the difference in the volume and character of the traffic; as for instance, whether it is mainly local or through traffic, whether the bulk of it is such as to require much or little handling, and whether the proportion of empty cars hauled be more or less. The value of the goods transported and their liability to damage, the condition of the road bed, the proportion of curves and grades, amount of train resistance, etc., are all elements which affect the result. The average cost must of course be much less upon a road like the New York Central, with a heavy east and west through traffic, than upon a local line with a light freight business like the New York, New Haven and Hartford. This is shown by the figures. But is there any evidence to show that the figures are not approximations, and that they do not involve many elements of uncertainty? As they appear in the regular annual reports they have a look of mathematical precision, as if they were a record of facts that admit of no question. They are misleading, however, and should not be valued for more than they are worth. They belong to a class of unreliable statistics that are apt to be taken by legislative dabblers in the science of railroad economy as a basis for needed reforms.

Some weeks ago, the *Railway Review* announced that a leading road had begun a monthly and yearly division of freight and passenger expenses upon a plan that might prove acceptable to other roads that were wrestling with the problem. A synopsis of the plan was also given in that paper, and it seems to be a good one as far as it goes, and it goes as far as it can. The sixty per cent or so of mixed or indivisible expenses are divided, Gordian knot fashion, or according to relative train mileage, and this is in fact about the best that can be done. It is only necessary that all roads should conform to one method or system of accounts, so far as the nature and conditions of business will admit, and then the comparative results as between different roads would not be so widely misleading.

THE RULE FOR SETTLEMENT FOR FREIGHT CARS DESTROYED.

The pertinent allusion made by a correspondent in our last issue to the necessity of a further revision of the rules regulating the interchange and repair of freight cars, will doubtless attract the attention of railroad men. The point to which reference is made is the clause in Rule 17, fixing the price of a new box car at $425 as a basis for settlement when such cars are destroyed on a foreign road. The great advance in the price of materials and labor since the last revision of these rules adds, of course, in a corresponding degree to the present value of cars built when prices were fifty per cent lower than they are now. A company, upon whose line a car is destroyed, has the option under the rule, as it now stands, to replace it with a new one or pay for it at the above valuation, less 6 per cent per annum for depreciation. It is obvious that but little ciphering would be necessary to decide between the alternatives; nor would the decision be any more difficult if the option lay with the owners of the car destroyed. The former would decide to pay; the latter would decide to have the old car replaced by a new one. The rule, as it now stands, works greatly to the disadvantage of parties whose cars are destroyed on other roads, and as the code can be revised on the application of seven railway companies who are parties to the agreement, it is to be hoped that the needed revision will receive early attention.

HOW TO REGULATE RAILROADS.

If the jurisdiction of the sovereign state of Georgia extended over the whole country, railroad business would, for the time being at least, be reduced to a system as easily understood as simplicity itself. There would be a universal unvarying schedule to which every thing would be made to conform. Every shipper and ticket-buyer could rest in the assurance that he was being fairly dealt with. There would be no fluctuation in rates and no vexatious readjustments to derange business calculations and disturb the general relations of trade. A handbill of moderate size would inform

every body, both inside and outside of railroad offices, just what were the legal charges for every item of freight or passenger service, and managers would be relieved from a load of responsibility. It may be asked why this simple and beautiful system has not been discovered before. It may be suggested in reply that we can not expect to know every thing at once. Railroading, like every other science, is progressive. The State of Georgia is also progressive, and its recently enacted railroad law shows how fast and in which direction it is traveling. This wonderful code, which is Grangerism pure and simple, classifies freights and prescribes a tariff of rates and fares on the basis of mileage, the classification and tariff applying equally to all the roads in the State. Discrimination of any kind is presumed to be unjust and is rigidly prohibited. As much as 25 cents may be charged for a single shipment, be the quantity or distance ever so small, but if a less charge is made in any case it must be in all cases. For sleeping-car berths, one dollar may be charged for 100 miles or less, and not more than one cent per mile for a greater distance.

How this plan will affect the development of traffic and the value of the existing railroad property in the State will be apparent in a year or two. Perhaps it will place all the roads, new and old, bankrupt and otherwise, upon a sound dividend-paying basis; but until this happy result shall actually appear, the public judgment may safely be held in suspense. Grangerism in Georgia may work differently from the way it worked in Wisconsin, but that remains to be seen.

THE movement of the Vanderbilt roads toward securing uniformity in the construction of freight cars, to which we briefly referred in our last issue, gives promise of some practical results at an early day. At the meeting of the representatives of the car departments of these roads held in this city in February, the general dimensions of certain cars were agreed upon, and also that one of each class should be built and ready for inspection by the middle of April, consisting of:

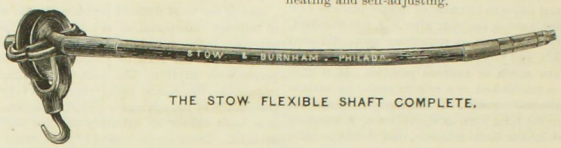
1 box-car, 34 feet long.
1 box-car, 29 feet long.
1 cattle car.
1 stock car, double deck.
1 flat car, 34 feet long.
1 gondola car, 29 feet long.
1 4-wheel drop-bottom coal car.
1 4-wheel gondola car, 11 tons capacity.
1 4-wheel box car, 10 tons capacity.

All except the 4-wheel cars are to be capable of carrying 20 tons each. They are to be built at West Albany and Morrisania, and as soon as completed will be sent to East Buffalo, N. Y., where road officers, car manufacturers and others will have an opportunity to inspect them, and to suggest any further improvements and modifications that may be thought desirable to perfect the standards. It is expected that this will lead to an agreement as to details, so that full specifications and drawings can then be prepared, to which all future construction on the roads represented (the New York Central, Lake Shore, Michigan Central, and Canada Southern) will be made to conform.

In addition to the general dimensions already agreed upon, it has also been decided to use iron trucks.

Car-Builders' Monthly Meeting.

There was a fair attendance at the March meeting. The time was mostly occupied in the inspection of models and improved appliances relating to car service and equipment. Among these was a specimen of canvas-back cane seating for cars, manufactured by the Hale & Kilburn Manufacturing Co., of New York; also the well known Atwood nut lock; an improved seat-spring manufactured by the Detroit Car Seat Spring Co.; Gardner & Co.'s reversible perforated seats, and oak decorated ceilings designed to take the place of the ordinary canvas head-linings; the Tallman brake for freight cars; a newly invented, ingenious and simple seal-lock for freight car doors; a folding step attached to car seats in the center aisle for brakemen to stand upon to trim lamps; an improved method of attaching signal lamps and carrying flags at the end of cars; a machine and car lubricating compound said to be extremely effective and economical; a working model of the Eames vacuum brake, and of the Lindblom flexible wheel base, illustrated in the March CAR-BUILDER; also a portable gas-blast apparatus designed by Mr. H. D. Goldsmith of this city for heating axles, tires, etc. These various inventions were briefly explained by the parties representing them, and although embracing but a tithe of the whole number belonging to this class, they afford evidence of the progress that is constantly being made in the discovery of better and more economical appliances for cars and car service.



THE STOW FLEXIBLE SHAFT COMPLETE.

THIS shaft, shown in the cut, is a portable connecting link between the line shaft or other power and any operating tool. It can be bent at will in any direction through any number of curves, and its use is apparent to any machinist. Many special tools have been designed to be used with this shaft, prominent among which are the series of drill presses taking drills from $\frac{1}{4}$ to $2\frac{1}{2}$ and 3 inches, for boring wood or iron; auger chucks for ordinary or special bits; spindles for emery or buffing wheels; and tools for sandpapering in any position or at any angle. Flexible shafts with drill press tapping clutch, auger clutch, emery wheel spindle or sand-papering block, have recently been placed in many prominent railroad, machine and locomotive shops of the country, and additional orders are constantly being received by the Stow Flexible Shaft Co., Limited, 500 North Fifteenth street, Philadelphia, Pa., who may be addressed for further particulars and catalogue.

THE WESTINGHOUSE BRAKE, according to statistics recently published in England, where there is now a very sharp competition among the proprietors of the different continuous brakes, has been applied to no less than 5,296 locomotives and 21,329 cars in different parts of the world. Of these, the automatic system has been applied to 1,770 engines and 5,218 cars in this country, to 362 engines and 2,337 cars in England, to 203 engines and 1,608 cars in France, to 143 engines and 1,440 cars in Belgium, to 53 engines and 87 cars in Germany, to 52 engines and 124 cars in New South Wales, and to smaller numbers in Russia, Holland, Sweden, India, South Australia, and Queensland. The non-automatic, or old system, is used very little, except in this country, where 2,677 engines and 10,244 cars have it. Fourteen different British roads have the automatic brake, but only a few seem to have it in general use on their passenger trains, eight having less than ten engines equipped with it. But the London, Brighton & South Coast (a great passenger road) has it on 122 engines and 1,195 cars, and the North British on 65 engines and 446 cars. One of the great French companies (the Western) has it in general use (177 engines and 1,460 cars) and so have the Belgian state railroads, where it is applied to 143 engines and 1,140 cars.—*Railroad Gazette.*

THE Pennsylvania company is now building twenty passenger-coaches of the Eastlake pattern at their shops in Altoona. The order for the year calls for forty coaches of this class, twenty of which are to be put in service on the Pennsylvania company's leased lines.

PROMINENT railroad representatives have gone to Washington for the purpose of influencing the passage of a bill which will compel the Great Western and Grand Trunk railroads of Canada to pay a duty on every loaded car which they bring into the United States.

READERS are referrred to the advertisement of Le Roy's Patent Journal Bearings for railway cars and engines. These bearings have been in use on the New York Central & Hudson River, and on the Utica & Black River roads since September last, and no hot journals have been reported. They are non-heating and self-adjusting.

Our Directory.

We note the following changes since our last issue. Readers are requested to give us prompt notice of changes when they occur:

Baltimore & Ohio.—Mr. E. K. Hyndman, for several years Superintendent of the Pittsburg Division, has resigned his position to take charge of the Connellsville Coke & Iron Co.

Chicago, Rock Island & Pacific.—Mr. John Given has been appointed Superintendent of the Keokuk & Des Moines Division, in place of Frank K. Hain, resigned. Mr. Given has heretofore been passenger and freight agent of the division.

Chicago, Burlington & Quincy.—Mr. E. Ryder is Assistant Superintendent, with office at Chicago, and W. C. Perkins Superintendent of Iowa Division, Burlington, Iowa.

Cincinnati, Indianapolis, St. Louis & Chicago.—This is the name of the new company organized as the successor of the Indianapolis, Cincinnati & Lafayette.

Cumberland & Pennsylvania.—Mr. N. W. Howson has been appointed Master Mechanic. The position has not been abolished, as heretofore reported.

Grayville & Mattoon.—Mr. G. L. Bradbury has been appointed General Manager and G. R. Cobleigh, Superintendent.

Louisville, New Albany & Chicago.—Mr. John McLeod, formerly Superintendent of Louisville, Cincinnati & Lexington R. R., has been appointed General Superintendent.

Manhattan Elevated.—Mr. Frank K. Hain has been appointed Assistant General Manager. He has for some years past been Superintendent of the Keokuk & Des Moines Division of the Chicago & Rock Island. Mr. E. F. Winslow has resigned the position of General Manager, to accept the Presidency of the St. Louis and San Francisco R. R.

Mobile & Montgomery.—This road having passed under the control of the Louisville & Nashville, Mr. B. Dunham, now in charge of the South and North Alabama Division, is also appointed Superintendent of the M. & M. Mr. Edmund L. Tyler has retired from the office of Superintendent of the M. & M.

New York, Pennsylvania & Ohio.—This is the new name of the Atlantic & Great Western road, which was recently purchased by the English bondholders. The general offices will be at Cleveland, Ohio.

Scioto Valley.—Mr. H. L. Morrill has been appointed General Superintendent. He was recently Receiver of the Central, of Iowa. Mr. Charles H. Cory, late of the Cairo & Vincennes road, has been appointed Master Mechanic, with office at Portsmouth, Ohio.

St. Louis, Iron Mountain & Southern.—Mr. E. L. Dudley is appointed Assistant General Superintendent, with office in St. Louis. Mr. J. W. Brown is appointed Superintendent of Texas Division, with office at Texarkana.

Directory of Master-Mechanics and Master Car-Builders

THROUGHOUT THE UNITED STATES AND CANADA.

REFERENCES.—* Mechanical Engineer. † Mechanical Superintendent. ‡ General Master Mechanic. †† Gen. Master Car-Builder. § Master of Machinery. ‖ General Foreman. ** Supt. of Machinery. §§ Supt. of Motive Power and Machinery. ‡‡ Supt. Cars and Buildings. ¶ Supt. of Equipment. ¶¶ Ass't Supt. of Equipment.

A

Railroad.	*Master-Mechanic.*	*Master Car-Builder.*	*Residence.*
Adiro ndack	Jacob Myers	James J. Traver	Saratoga, N. Y.
Alabama Central	Simon Gay	James Owens	Selma, Ala.
Alabama Great Southern	§§John McVey		Chattanooga, Tenn.
Albany & Susquehanna	§§R. C. Blackall	R. C. Blackall	Albany, N. Y.
Albany & Susquehanna	C. A. Jones	J. Skinner	Oneonta, N. Y.
Arkansas Midland	J. B. Johnson	J. B. Johnson	Helena, Ark.
Ashtabula & Pittsburg	Geo. J. Parkins	Wm. Marquis	Allegheny City, Pa.
Atchison, Topeka & Santa Fe	§§Geo. Hackney	Geo. Hackney	Topeka, Kan.
Western Division	A. C. Stiles		Pueblo, Col.
Atchison & Nebraska	‡ D. Volk	T. A. H Berkey	Atchison, Kan.
Allegheny Valley	G. W. Glass	R. Gunning	Pittsburgh, Pa.
Atlanta & Charlotte Air-Line	C. D. Wall	C. D. Wall	Atlanta, Ga.
Atlanta & West-Point	Wm. Rushton		Atlanta, Ga.
Atlanta & West-Point		R. D. Cole	Newnan, Ga.
Atlantic & North Carolina	Basil Manly		New Berne, N. C.
Atlantic, Mississippi & Ohio			
Norfolk & Peter Division	J. T. Robinett	J. T. Robinett	Petersburg, Va.
Virginia & Tenn. Division	F. Sterk	W. A. Morgan	Lynchburg, Va.
Western Division	A. C. Stiles		Pueblo, Col.

B

Baltimore & Ohio	§John C. Davis	J. S. Shryack	Baltimore, Md.
Baltimore & Ohio	A. J. Cromwell	James H. Mill	Baltimore, Md.
Baltimore & Ohio	Wm. Edwards		Martinsburg, Va.
Baltimore & Ohio	I. N. Kalbaugh		Piedmont, Va.
Baltimore & Ohio	E. L. Weisgerber		Grafton, W. Va.
Baltimore & Ohio	Robert Maxwell		Cumberland, Md.
Baltimore & Ohio	Chas. Hirsch		Wheeling, W. Va.
Baltimore & Ohio	S. B. Crawford		Parkersburg, W. Va.
Central Ohio Division	O. B. Perkins		Zanesville, O.
Ohio & Chicago Division	§Sam. Houston		Newark, O.
Central Ohio Division	James Stewart		Newark, O.
Central Ohio Division	H. M. Ingler		Bellaire, O.
Lake Erie Division	And. Beckert		Sandusky, O.
Chicago Division	W. Y. Johnston		Garrett, Ind.
Chicago Division	F. J. Gunther		Chicago Junc., O.
Pittsburg Division	John Sampsel		Kingston, Ill.
Baltimore & Potomac	§§R. H. Soule		Connellsville, Pa.
Bath & Hammondsport	S. S. Reynolds		Baltimore, Md.
Bedford, Springville, O. & Bloom'd	Capt. Geo. Elliott		Ham'ondsp't, N. Y.
Bellefonte & Snow-Shoe	H. D. Landis	H. D. Landis	Bedford, Ind.
Bennington & Rutland	G. W. Blanchard		Bellefonte, Pa.
Boston & Albany	Wilson Eddy		Rutland, Vt.
Boston & Albany	A. B. Underhill		Springfield, Mass.
Boston & Albany			Boston, Mass.
Boston & Albany	T. B. Purvis	F. D. Adams	Allston, Mass.
Boston & Albany			Greenbush, N. Y.
Boston & Providence	J. E. Doran		E. Albany, N. Y.
Boston, Barre & Gardner	George Richards	John Lightner	Roxbury, Mass.
Boston, Concord & Montreal	Chas. F. Brigham		Worcester, Mass.
Boston & Maine	Ralph Adams	L. D. Pickering	Lake Village, N. H.
Boston & Maine	Wm. Smith		Boston, Mass.
Boston & Lowell		D. C. Richardson	Lawrence, Mass.
Boston & New York Air-Line	J. F. Crockett	J. F. Crockett	Boston, Mass.
Boston, Revere Beach & Lynn			New Haven, Conn.
Boston, Revere Beach & Lynn	J. L. Folsom	John Coghlan	Boston, Mass.
Brunswick & Albany	M. Thornton		Brunswick, Ga.
Burlington & Missouri River in Neb.	D. Hawksworth	D. Hawksworth	Plattsmouth, Neb.
Burlington, Cedar Rapids & Nor.	R. W. Bushnell		Cedar Rapids, Ia.
Burlington & Southwestern		A. B. Allen	Farmington, Ia.
Buffalo & Southwestern	J. G. Hubbard		Buffalo, N. Y.
Buffalo, New York & Philadelphia	Allen Vail		Buffalo, N. Y.

C

Cairo & St. Louis	**G. B. Simonds	G. B. Simonds	E. Carondelet, Ill.
Cairo & Vincennes	A. Van Tuyl	A. Van Tuyl	Carmi, Ill.
California, Pacific & Northern	D. Rutherford	D. Rutherford	So. Vallejo, Cal.
Camden & Atlantic	Rufus Hill	S. Wills	Camden, N. J.
Canada Central	H. J. Marshall		Brockville, Can.
Canada Southern and Branches	*John Ortton	John Ortton	St. Thomas, Ont.
Canada Division	W. A. Short		St. Thomas, Ont.
U. S. Division	O. F. Puntz		Grosse Isle, Mich.
Carolina Central	§Jas. Maglenn	S. R. Ethridge	Laurinburg, N. C.
Catasauqua & Foglesville	Tho. E. Evans	Chas. J. Holbach	Catasauqua, Pa.
Central of Georgia	D. D. Allen	C. C. Millar	Savannah, Ga.
Atlanta Division	D. M. Gugel	Jas. A. Knight	Macon, Ga.
Central of New Jersey	Wm. Woodcock	George Hackett	Elizabeth, N. J.
Lehigh & Susquehanna Div.	L. C. Brastow	L. C. Brastow	Wilkesbarre, Pa.
Central of Iowa	M. C. Wheeler	T. L. Seevers	Marshalltown, Ia.
Central Pacific	‡A. J. Stevens	††Benj. Welch	Sacramento, Cal.
Western Division	Geo. D. Welch	W. B. Ludlow	Oakland, Cal.
Central Pacific		G. J. Turner	Sacramento, Cal.
Visalia Division	S. Johnson		Tulare, Cal.
Sacramento & Oregon Div.	M. W. Cooley	Phil. Douglass	Sacramento, Cal.
Truckee Division	Geo. Gregg	Wm. McPherson	Wadsworth, Nev.
Humboldt Division	W. F. Smith	J. C. Doughty	Carlin, Nev.
Salt Lake Division	Jas. Lamb		Terrace, Utah.
Salt Lake Division		‖A. Sherburne	Ogden, Utah.
Central Vermont	§§J. M. Foss		St. Albans, Vt.
New London & Northern Div.	J. W. Dow	S. O. Banks	New London, Conn.
Rutland Division	N. L. Davis	N. L. Davis	Rutland, Vt.
Chesapeake & Ohio	§John McFarland	J. N. King	Richmond, Va.
Chesapeake & Ohio	Tho. L. Chapman	H. C. Bassinger	Huntingdon, W. Va.
Cheraw & Darlington	John Bissett	W. H. Day	Florence, S. C.
Cherokee	P. J. Bracken		Cedartown, Ga.
Cheshire	F. A. Perry	‖A. E. Howard	Keene, N. H.
Chepang	C. M. Allen	C. M. Allen	Litchfield, Conn.
Charlotte, Columbia & Augusta		C. Trosger	Columbia, S. C.
Chicago & Pacific	James Penny	C. N. Code	Chicago, Ill.
Chicago & Northwestern	** Geo. W. Tilton	††William Campbell	Chicago, Ill.
Wis., Mad. & Mill. Divis.			Chicago, Ill.
Galena Division			Chicago, Ill.
Iowa Division	J. O. Chapman	H. L. Preston	Clinton, Ia.
Peninsula Division	Geo. White		Escanaba, Mich.
Winona & St. Peters Div.	W. A. Scott	W. A. Scott	Winona, Minn.
Chicago & Alton	§§A. A. Ackerly		Bloomington, Ill.
Chicago, Burlington & Quincy	§§H. B. Stone	*J. Chistiansen	Aurora, Ill.
Galesburg Division	Robert Colville		Galesburg, Ill.
Iowa Division	Joel West		Burlington, Ia.
Iowa Division	C. W. Eckerson		Creston, Ia.
St. Louis Division	H. Whiting		Beardstown, Ill.
Chicago & Springfield	W. B. McKenna		Clinton, Ill.
Chicago, Clinton, Dubuque & Minn.	E. Smedley	E. Smedley	Dubuque, Ia.
Chicago, Rock Island & Pacific	†T. B. Twombly	B. K. Verbryck	Chicago, Ill.
Keokuk & Des Moines Div.	S. W. Wakefield	Henry Kummer	Keokuk, Iowa.
Southwestern Division	R. O. Carscadin		Trenton, Mo.
Chicago & West Michigan	Russell Booth		Muskegon, Mich.
Chicago & Eastern Illinois	Allen Cooke	Allen Cooke	Danville, Ill.
Chicago & Iowa	H. S. Bryan		Aurora, Ill.

Railroad.	*Master-Mechanic.*	*Master Car-Builder.*	*Residence.*
Chicago, Milwaukee & St. Paul	J. M. Lowry		Milwaukee, Wis.
La Crosse & P. Du Ch. Div		John Bailie	Milwaukee, Wis.
Northern Division		Wm. E. Kittredge	Milwaukee, Wis.
Iowa & Minn. Division	J. O. Pattie		Minneapolis, Minn.
Racine & S. West Div	John Taylor	E. A. Eddy	Racine, Wis.
Chicago & Paducah	T. J. Grosh	T. J. Grosh	Racine, Wis.
Chicago, Pekin & Southwestern	A. R. Overton		Cincinnati, O.
Chicago, Pekin & Southwestern			Joliet, Ill.
Chicago, St. Louis & New Orleans	**W. H. Purdy	A. S. Jackson	Streator, Ill.
Chicago, St. Louis & New Orleans	E. D. Anderson		McComb City, Miss.
Chicago, St. Louis & New Orleans	J. M. Keith		McComb City, Miss.
Chicago, St. Louis & New Orleans	J. F. White		Jackson, Tenn.
Chicago, St. Paul & Minneapolis	Matt Ellis	J. C. Fischer	Water Valley, Miss.
Cincinnati, Wabash & Michigan	S. B. Tinker	S. B. Tinker	Hudson, Wis.
Cincinnati, Hamilton & Dayton	James Eckford	W. H. H. Allison	Wabash, Ind.
Indianapolis Division	Edward Moore		Cincinnati, O.
Cincinnati, Lafayette & Chicago	J. B. Morgan	J. B. Morgan	Indianapolis, Ind.
Cincinnati, Richmond & Chicago	Wesley S. Brewer		Lafayette, Ind.
Clin. Rockport & So. Western	B. W. Smith	J. H. Bauman	Richmond, Ind.
Cincinnati, Sandusky & Cleveland	B. J. Gregg		Rockport, Ind.
Cincinnati Southern	Tho. Price	Geo. Butler	Sandusky, O.
Cleve., Col., Cin. & Indianapolis	†L. S. Young	††L. S. Young	Cincinnati, O.
Indianapolis Division	A. R. McAlpine		Cleveland, O.
Columbus & Cin. Division	F. G. Kaufholz	Wm. Cleave	Brightwood, Ind.
Cleveland & Pittsburg	N. E. Chapman	A. Steinbrunner	Cleveland, O.
Cleve., Mt. Vernon & Columbus	J. W. Holloway	J. W. Holloway	Cleveland, O.
Cleve., Tusc. Valley & Wheeling	W. F. Turreff	Geo. H. Pratt	Akron, O.
Cobourg, Peterboro & Marmora	Wm. Polson		Black River, O.
Columbus & Hocking Valley	J. B. Hutchins	J. M. Rockafield	Cobourg, Canada.
Columbus & Toledo	I. G. Hutchins	J. M. Rockafield	Columbus, O.
Concord	I. G. Hutchins	J. M. Rockafield	Columbus, O.
Concord & Portsmouth	J. T. Gordon	J. T. Gordon	Concord, N. H.
Concord & Claremont	J. T. Gordon	J. T. Gordon	Concord, N. H.
Connecticut River	**J. N. Lauder		Concord, N. H.
Connecticut River	§Wm. H. Stearns	R. Hitchcock	Springfield, Mass.
Connecticut Valley	S. E. Brewer	S. E. Brewer	Hartford, Conn.
Connecticut Western	John C. Barton		Hartford, Conn.
Conn. & Passumpsic Rivers	John R. Rubbard		Lyndonville, Vt.
Corning, Cowanesque & Antrim	O. C. Patchell	O. C. Patchell	Corning, N. Y.
Cumberland Valley	A. S. Hull	G. W. Nitterhouse	Chambersburg, Pa.
Cumberland & Pennsylvania	N. W. Howson	Nathan Binnix	Mt. Savage, Md.

D

Dak. So. & Sioux City & Pembina	J. H. Moulton	J. H. Moulton	Yankton, Dak.
Danbury & Norwalk	N. M. George	N. M. George	Danbury, Conn.
Danville & Southwestern	B. L. Baldwin		Danville, Ill.
Davenport & Northwestern	H. E. Woods		Davenport, Ia.
Dayton & Union	H. S. Gordon	H. S. Gordon	Dayton, O.
Dayton & Southeastern	Wm. E. Cooper		Dayton, O.
Dayton & Michigan	John Black		Lima, O.
Delaware, Lackawanna & West.	Walter Dawson	Robert McKenna	Harrisburg, Pa.
Morris & Essex Division	W. H. Lewis		Kingsland, N. J.
Morris & Essex Division		J. W. Baker	Dover, N. J.
Oswego & Syracuse Division	James Buchanan		Syracuse, N. Y.
Utica, Chenango & Susq. Div.	Tho. Thatcher		Utica, N. Y.
Bloomsburg Division	Charles Graham		Kingston, Pa.
Delaware & Chesapeake	Jos. A. Baynard		Easton, Md.
Delaware & Hudson Canal Co	**R. C. Blackall		Albany, N. Y.
Rensselaer & Saratoga Div.	J. L. Corey	T. Orchard	Carbondale, Pa.
Denver Pacific	§R. McDougall	John Wicks	Green Island, N. Y.
Denver & Rio Grande	N. W. Sample	N. W. Sample	Denver, Col.
Denver, South Park & Pacific	James Kirk	James Kirk	Denver, Col.
Des Moines & Fort Dodge	John McGrayel	R. Merrill	Denver, Col.
Detroit & Bay City	R. P. Baillie		Grand Junction, Ia.
Detroit, Grand Haven & Mil.	Fred Parker		Bay City, Mich.
Detroit, Lansing & Northern	G. C. Watrous	G. C. Watrous	Detroit, Mich.
Dorchester & Delaware			Ionia, Mich.
Dunkirk, Allegheny Val. & Pitts	‖ C. Haggett	J. C. Haggett	Cambridge, Md.

E

East Broad Top	Wm. C. Maynes		Dunkirk, N. Y.
Eastern			Orbisonia, Pa.
Eastern Kentucky	D. L. Weaver	D. L. Weaver	East Boston, Mass.
E. Tennessee, Virginia & Georgia	C. A. Hodge	Joseph Armbruster	Riverton, K. y.
Erie & Pittsburg	J. N. Wood	J. N. Wood	Knoxville, Tenn.
Eureka & Palisade	J. M. Alson		Erie, Pa.
European & North Am. (of Maine)	A. O. Bailey	A. O. Bailey	Eureka, Nev.
Evansville & Terre Haute	John L. White	Joseph Suker	Mattawamke'g, Me.
Evansville, Terre Haute & Chic.	§§W. D. Macfarlane		Evansville, Ind.
			Terre Haute, Ind.

F

Fitchburg	§§Geo. A. Cooledge	Enos Varney	Charlestown, Mass.
Fitchburg	W. A. Foster	Jacob Marsh	Fitchburg, Mass.
Vermont & Mass. Div.	T. J. Ratswell	T. J. Ratswell	E. Saginaw, Mich.
Flint & Pere Marquette	James S. McElroy	James S. McElroy	Jacksonville, Fla.
Florida Central	Thomas Meehan	‖Edward Riley	L. I. City, N. Y.
Flushing, North Shore & Central	W. Hollister		Jackson, Mich.
Fort Wayne & Jackson	Wm. McPhail	Wm. McPhail	Fort Wayne, Ind.
Fort Wayne, Muncie & Cincinnati			

G

Galv., Harrisburg & San Antonio	D. T. Davis		Harrisburg, Tex.
Galveston, Houston & Henderson	R. B. Small		Galveston, Tex.
Geneva, Ithaca & Sayre	J. N. Weaver		Waverly, N. Y.
Georgia		E. R. Brown	Packerton, Pa.
Grand Haven	John S. Cook	T. M. Preval	Augusta, Ga.
Grand Tower & Carbondale	A. S. Parish		Allegan, Mich.
Grand Trunk	Hugh Smith	Hugh Smith	Grand Tower, Ill.
Grand Trunk	†Herbert Wallis	Wm. McWood	Montreal, Canada.
Grand Trunk	‖Warren Noyes		Gorham, N. H.
Grand Trunk		‖Duncan Menish	Portland, Me.
Grand Rapids & Indiana	J. M. Boon		Fort Wayne, Ind.
Grand Rapids & Indiana	J. R. Fish	J. R. Fish	Gr'nd Rapids, Mch.
Grayville & Mattoon	C. H. Cory		Mattoon, Ill.
Great Western, of Canada	†C. K. Domville		Hamilton, Can.
Great Western, of Canada	C. F. Hanson	Henry Childs	London, Ont.
Green Bay & Minnesota	Edw. Osborne		Green Bay, Wis.
Greenville & Columbia	W. I. Parrish		Helena, S. C.

H

Hanover Junction & Gettysburg	John J. Bingley	Henry Britcher	Hanover, Pa.
Hannibal & St. Joseph	Tho. G. Gorman	Tho. G. Gorman	Hannibal, Mo.
Housatonic	N. Slingland	J. J. Ferris	Falls Village, Conn.
Houston, East & West Texas	J. E. Wiggin		Houston, Tex.
Houston & Texas Central	L. C. Noble	James McGee	Houston, Tex.
Huntingdon & Broad Top	Wm. Barkla		Saxton, Pa.

I

Illinois Central	**S. J. Hayes	W. B. Snow	Chicago, Ill.
Chicago Division	Henry Schlacks		Chicago, Ill.
South Division	David Oxley		Centralia, Ill.
North Division	J. B. Edams		Amboy, Ill.
Iowa Division	Thomas W. Place		Waterloo, Ia.
Springfield Division	W. R. McKenna		Clinton, Ill.
Illinois Midland	H. H. Osborn		Paris, Ill.
Illinois & St. Louis	J. H. Smith		Belleville, Ill.
Illinois & St. Louis		Charles Rothe	E. St. Louis, Ill.
Indianapolis, Cin. & Lafayette	J. S. Patterson	J. S. Patterson	Cincinnati, O.
Indianapolis, Decatur & Springfield	Pulaski Leeds		Indianapolis, Ind.
Indianapolis, Peru & Chicago	John McKenna	John McKenna	Peru, Ind.
Indianapolis & St. Louis	A. J. Sanborn	A. J. Sanborn	Mattoon, Ill.
Indiana, Bloomington & Western	C. A. Thompson	H. Ford	Urbana, Ill.
International & Great Northern	John G. Conlon	W. H. Martin	Palestine, Tex.

Railroad.	*Master-Mechanic.*	*Master Car-Builder.*	*Residence.*
Intercolonial	†H. A. Whitney	Edw. Shaffer	Moncton, N. B.
Iron	Perry Scott	Clem. Roetling	Ironton, O.

J

Jacksonville, Pensacola & Mobile	John P. Laird		Tallahassee, Fla.
Jeffersonville, Mad. & Indianapolis	Wm. Swanston	J. D. Mellwain	Jeffersonville, Ind.
Jacksonville, N. West. & S. East.	B. J. Miller		Jacksonville, Ill.
Joplin	P. T. Butterly	P. T. Butterly	Girard, Kan.
Junction & Breakwater	J. A. Maguire		Lewes, Del.

K

Kansas City, Ft. Scott & Gulf	W. D. Rowley		St. Joseph, Mo.
Kansas City, Fort Scott & G. of	J. S. McCrum	A. N. Montier	Kansas City, Mo.
Kansas City, Lawrence & South'n	J. S. McCrum		Kansas City, Mo.
Kansas City & Eastern	J. H. Burnham	J. H. Burnham	Independence, Mo.
Kan. City, St. Jo. & Coun. Bluff	Wm. D. Rowley	Theo. Aylesbury	St. Joseph, Mo.
Kansas Central	Wm. McCall		Leavenworth, Kan.
Kansas Pacific	**John MacKenzie	T. B. Roberts	Armstrong, Kan.
Kaw Valley Division	James Long		Armstrong, Kan.
Smoky Hill Division	John B. Daily		Ellis, Kan.
Denver Division	R. McDougal	John Clock	Denver, Col.
Kentucky Central	J. R. Ledyard	J. L. Hackathorn	Covington, Ky.
Knox & Lincoln	E. Bolton	C. L. Turner	Bath, Me.

L

Lake Erie & Western	**Everett Clemens		Fremont, Ohio.
Lake Erie & Western	H. L. Cooper		Lafayette, Ind.
Lake Ontario Southern	Geo. Thompson	Wm. Currier	Sodus Point, N. Y.
Lake Shore & Michigan Southern	James Sedgley,	†John Kirby	Cleveland, Ohio.
Michigan Southern Division	Geo. W. Stevens		Elkhart, Ind.
		Frank O. Bray	Adrian, Mich.
Toledo Division	J. M. Sanborn	W. O. Smith	Norwalk, Ohio.
Erie Division	L. O. Gassett	J. Withycombe	Cleveland, Ohio.
Buffalo Division	Edward Studley	A. C. Robson	Buffalo, N. Y.
Lehigh Valley	John I. Kinsey		South Easton, Pa.
Lehigh Valley	P. Rofweker		Weatherly, Pa.
Lehigh Valley	John Campbell		Delano, Pa.
Lehigh Valley	D. Clark		Hazleton, Pa.
Lehigh Valley	A. Mitchell		Waverly, Pa.
Lehigh Valley		E. R. Brown	Manch Chunk, Pa.
Little Rock & Fort Smith	James Eblin	James Malone	Argenta, Ark.
Little Rock, Miss. River & Texas	Joseph Taylor	Joseph Taylor	Arkans's City, Ark.
Los Angeles & Independence	Jas. Velsir	J. S. Young	Los Angeles, Cal.
Louisville, New Albany & Chicago	Geo. Ruhlandt	Geo. Helfrich	New Albany, Ind.
Long Island	Thos. Meehan	Hugh Longest	L. Isld City, N. Y.
Louisville, Cincinnati & Lexing'n	Schaeffer	A. Schaeffer	Louisville, Ky.
Louisville & Nashville	**Reuben Wells		Louisville, Ky.
Louisville Division	D. P. Rennie		Louisville, Ky.
Nashville & Decatur Div	E. M. Hunnstone	J. P. Furguson	Nashville, Tenn.
South & North Ala. Div.	C. W. White		Birmingham, Ala.
Memphis & Ohio Div	Thos. Walsh		Memphis, Tenn.
Clarksville Division	Wm. Adams		Bowling Green, Ky.
Ev., Hen. & Nashville Div	E. M. Humstone		Nashville, Tenn.

M

Macon & Brunswick	R. Wagnon	R. Wagnon	Macon, Ga.
Maine Central	J. W. Philbrick	J. W. Philbrick	Waterville, Me.
Maine Central		C. H. Kenison	Augusta, Me.
Manchester & Lawrence	J. T. Gordon	J. T. Gordon	Concord, N. H.
Manhattan Elevated	Allan Stirling		New York, N. Y.
Marietta, Pittsburg & Cleveland	Thos. Robertson		Marietta, Ohio.
Marietta & Cincinnati	E. M. Bosley	E. M. Bosley	Chillicothe, Ohio.
Marquette, Houghton & Onton'gn	W. H. Williams	H. D. Lyons	Marquette, Mich.
Memphis, Paducah & Northern	G. M. Taylor	G. M. Taylor	Paducah, Ky.
Memphis & Little Rock	Tho. Rennell	B. Twitchell	Argenta, Ark.
Memphis & Charleston	H. N. Burford	J. J. Kasey	Memphis, Tenn.
Michigan Central	S. H. Edgerly		Jackson, Mich.
Michigan Central		††Robert Miller	Detroit, Mich.
Milwauke-, Lake Shore & West'n	S. Charnly		Manitowoc, Wis.
Minneapolis & St. Louis	Tho. Downing	Tho. Downing	Minneapolis, Minn.
Mineral Point	Robert Hay	Robert Hay	Mineral Pt., Wis.
Mineral Range	George F. Coon		Hancock, Mich.
Mississippi & Tennessee	Geo. Haszinger	S. J. Bolton	Memphis, Tenn.
Missouri & western	A. C. Persing		Pierce City, Mo.
Missouri, Iowa & Nebraska	J. G. Crozier		Alexandria, Mo.
Missouri, Kansas & Texas	H. H. Alexander		Dennison, Texas.
Missouri, Kansas & Texas	**G. W. Cushing	John C. Barber	Sedalia, Mo.
Missouri, Kansas & Texas	Wm. T. Small		Parsons, Kan.
Missouri Pacific	‡‡John Hewitt	John Hodge	St. Louis, Mo.
Missouri Pacific	R. D. Gorsett		St. Louis, Mo.
Missouri Pacific	Geo. W. Walshe		Sedalia, Mo.
Missouri Pacific	H. V. Faries		Atchison, Kan.
Mobile & Montgomery	W. H. Pike	Lewis Barham	Montgomery, Ala.
Mobile & Girard	J. C. Albrecht	A. J. Nix	Columbus, Ga.
Mobile & Ohio	R. H. Briggs	J. T. Booth	Whistler, Ala.
Mobile & Ohio	John Fitzgerald		Macon, Miss.
Mobile & Ohio	M. T. Carson		Jackson, Tenn.
Montgomery & Eufaula	D. M. Gugel	James A. Knight	Macon, Ga.
Morgan's Louisiana & Texas	N. Tilton	Wm. O'Brien	Algiers, La.

N

Nashua & Lowell	S. A. Davis	S. A. Davis	Nashua, N. H.
Nashville, Chattan'ga & St. Louis	James Cullen	J. G. Sawyer	Nashville, Tenn.
St. Louis Division	L. B. Salisbury	W. H. H. Price	Mt. Vernon, Ill.
Naugatuck	Henry Halford	George W. Gray	Bridgeport, Ct.
Nebraska	D. Hawksworth		Plattsmouth, Neb.
Newburg, Dutchess & Connecticut	W. G. Vanbuskirk		Dutchess J'n, N. Y.
New Brunswick	P. A. Logan	P. A. Logan	Fredericton, N. B.
New Brunswick & Canada	Tho. Armstrong	G. Houlton	St. Andrews, N. B.
New Haven & Northampton	Henry Fox	John Sweeny	New Haven, Ct.
New Jersey Midland	W. C. Ennis		Wortendyke, N. J.
New Jersey & New York	J. S. Drake		Jersey City, N. J.
New Jersey Southern	Rufus Blodgett		Manchester, N. J.
New Orleans & Mobile	Josiah Bettis		Mobile, Ala.
New York, Lake Erie & Western	V. Blackburn		Susquehanna, Pa.
New York, Lake Erie & Western	‡‡F. M. Wilder		Susquehanna, Pa.
New York, Lake Erie & Western	J. H. Vreeland		Jersey City, N. J.
New York, Lake Erie & Western	Tho. West	M. Wilder	E. Buffalo, N. Y.
New York, Lake Erie & Western	George H. Griggs		Hornellsville, N.Y.
New York, Lake Erie & Western		D. B. Goodell	Elmira, N. Y.
New York, Lake Erie & Western		J. N. Milehan	Jersey City, N. J.
New York, Lake Erie & Western	J. Van Vechten	J. Van Vechten	Port Jervis, N. Y.
New York, Lake Erie & Western	Jos. Bradt		Rochester, N. Y.
New York & Harlem	‡‡Wm. M. Strong		New York.
New York & Harlem		C. E. Garey	Morrisania, N. Y.
New York Central & Hud. River		††Leander Garey	New York, N. Y.
New York Central Division	‡‡G. B. Van Vorst	D. Holt	West Albany, N.Y.
New York Central Division	‡‡Henry Watkeys		Syracuse, N. Y.
New York Central Division	‡‡Amos Gould	Wm. Johnson	E. Buffalo, N. Y.
New York Central Division	‡‡S. L. White	Richard Donahy	Niagara Falls, N.Y.
New York Central Division		E. A. Olmstead	E. Buffalo, N. Y.
Hudson River Division	‡‡Wm. Buchanan	Peter Smith	New York, N. Y.
New York Central Division		W. B. White	E. Rochester, N.Y.
New York Central Division		Geo. Cummings	Rochester, N. Y.
New York, Ontario & Western	Edw. Minshull		Middletown, N. Y.
New York & New England	‡‡Geo. E. Boyden	Elias F. Pratt	Boston, Mass.
Norwich & Worcester Div	Richard Colburn	John W. Marden	Norwich, Ct.
New York, N. Haven & Hartford	‡‡H. Kettendorf	James Denver	New Haven, Ct.
Hartford Division	‡‡Jno. Hennessy, Jr.	L. Packard	Hartford, Ct.
New York & Manhattan Beach	Lewis James		Bay Ridge, L. I.
New York, Penn. & Ohio	‡William Fuller	††J. H. F. Wiers	Meadville, Pa.
New York, Penn. & Ohio	J. A. Cooper	D. S. Dockstader	Meadville, Pa.
New York, Penn. & Ohio	N. Wright	W. G. Huggard	Cleveland, O.

Railroad.	*Master-Mechanic.*	*Master Car-Builder.*	*Residence.*
New York, Penn. & Ohio		S. V. Smith	Kent, O.
New York, Penn. & Ohio	William Hill	J. W. Holmes	Gallon, O.
New York, Penn. & Ohio		J. T. Fosdick	Salamanca, N. Y.
New York, Penn. & Ohio		Geo. Wilson	Dayton, O.
Northern Central	‡‡R. H. Soule	G. W. Demarest	Baltimore, Md.
Northern Central	J. M. Coale		Baltimore, Md.
Northern Central	James Strode	J. C. Dyott	Elmira, N. Y.
Northern New Hampshire	**Jas. N. Lauder		Concord, N. H.
Northern of Canada	Peter Clark	Peter Clark	Toronto, Can.
Northern Pacific	**A. P. Farrar	A. P. Farrar	Brainerd, Minn.
Dakota Division	A. Rupert		Fargo, Dak.
Northeastern		W. H. Day	Florence, S. C.
North Pacific Coast	James Walch		Saucelito, Cal.
Northwestern & Grand Trunk	†K. Blackwell	Geo. W. Prescott	Battle Creek, Mich.

O

Ogdensburg & Lake Champlain	Abraham Klohs		Malone, N. Y.
Ohio & Mississippi	‡J. F. Sechler		Vincennes, Ind.
Ohio & Mississippi		J. P. Coulter	Cochrane, Ind.
Cincinnati Division	John Thumser		Seymour, Ind.
St. Louis Division	J. B. Wilson		Vincennes, Inc.
Springfield Division	E. K. Sechler		Pana, Ill.
Old Colony	J. K. Taylor	A. Gleason	Boston, Mass.
B. C. F. & N. Bedford Div	Geo. W. Reynolds	Fam. E. Stevens	Taunton, Mass.
Oregon & California	‡‡J. Brandt		Portland, Oregon.
Oregon Steam Navigation Co	J. F. Curtis		Dalles, Oregon.

P

Paducah & Elizabethtown	W. D. Robb	W. D. Robb	Elizabethtown, Ky.
Painesville & Youngstown	J. H. Jones		Painesville, O.
Panama	Thos. S. O'Brien		Aspinwall, U. S. C.
Parker & Karns City	Philip Davies	Wm. Wolford	Parker City, Pa.
Pensacola	R. G. Nichol		Pensacola, Fla.
Pensacola & Selma	R. H. Kelly		Selma, Ala.
Pennsylvania	‡‡T. N. Eli		Altoona, Pa.
Pennsylvania	H. D. Garrett	J. W. Van Houten	W. Philadelphia, Pa
Pennsylvania	E. L. Caum	Samuel W. Myers	Harrisburg, Pa.
Pennsylvania	G. W. Strattan	John P. Levan	Altoona, Pa.
Pennsylvania	D. O. Shaver	J. G. Stewart	Pittsburg, Pa.
New Jersey Division	L. A. Boodevex	E. F. Boodevex	Meadowshore, N.J.
New Jersey Division		David H. Baker	Jersey City, N. J.
New Jersey Division	‡‡H. S. Hayward		Jersey City, N. J.
New Jersey Division	Tho. Kerr	P. S. Bogart	So. Amboy, N. J.
New Jersey Division	R. McDowell		Lambertville, N. J.
New Jersey Division	W. McAlister		Camden, N. J.
West Penn. Division	C. B. Street	M. H. Fails	Blairsville, Pa.
Peoria, Decatur & Evansville	Isaac Adams		Pekin, Ill.
Peoria, Pekin & Jacksonville	R. F. Hurd	R. F. Hurd	Pekin, Ill.
Peoria & Springfield	E. Detzerdt	E. Detzerdt	Peoria, Ill.
Petersburg	R. B. Andrews	J. W. Fleming	Petersburg, Va.
Philadelphia, Wilmington & Ba't	S. A. Hodgman	Wm. Tungren	Wilmington, Del.
Philadelphia & Atlantic City	J. W. Wright	E. Lippincott	Camden, N. J.
	‡‡Howard Fry		Williamsport, Pa.
	W. F. Beardsley		Sunbury, Pa.
Philadelphia & Erie	W. L. Forster		Renovo, Pa.
	W. L. Holman		Kane, Pa.
	W. T. Smith		Erie, Pa.
Philadelphia & Baltimore Central	S. D. Danfield	S. D. Danfield	Chester, Pa.
Philadelphia & Reading	*L. B. Paxson	John H. Rankin	Reading, Pa.
Catawissa Branch	W. H. Ellis	C. D. Ellis	Catawissa, Pa.
Germantown & Norris'n Div	Jackson Richards		Philadelphia, Pa.
North Penn. Division	Chas. Norton	C. W. Hammann	Philadelphia, Pa.
Southeastern (Canada)	Edwin Goss		Richford, Vt.
Piedmont Air Line	‡R. D. Wade		Richmond, Va.
Rich. & Danville Div.		J. B. Vaughan	Richmond, Va.
North Carolina Div.		J. C. Holt	Comp. Shops, N. C.
Pittsburg, Cincinnati & St. Louis	‡‡G. W. Rhodes		Columbus, O.
Little Miami Division	J. H. Setchel	John McVay	Cincinnati, O.
Little Miami Division		M. P. Ford	Columbus, O.
Col., Cin. & Ind. Division	Robert Curtis	Tho. Chamberlin	Columbus, O.
Col., Cin. & Ind. Div.	Geo. H. Prescott	Chas. H. Starr	Transport, Ind.
Col. Cin. & Ind. Division	C. M. St. Clair		Indianapolis, Ind.
Cin. & Mus. Val Division	Leroy Kells	Daniel Jewell	Lancaster, O.
Pitts. Cin. & St. Louis Div's'n	Ross Kells		Penisbn, O.
Pitts. Cin. & St. Louis Divis'n		A. K. Mansfield	Steubenvill, O.
Pittsburg, Fort Wayne & Chicago	Geo. Parkin	John Marquis	Allegheny, Pa.
Pittsburg, Fort Wayne & Chicago	J. M. Boon	Israel Lee	Fort Wayne, Ind.
Pittsburg, Fort Wayne & Chi. ago		J. J. Kirkland	Crestline, O.
Pittsburg, Titusville & Buffalo	H. J. Tookhammer	John Monks	Oil City, Pa.
Pittsburg, Virginia & Charleston	Wm. Ilsinger		Pittsburg, Pa.
Pittsburg & Lake Erie	S. W. Haines		Pittsburg, Pa.
Portland & Ogdensburg	Geo. H. Poor	W. G. Brewer	Portland, Me.
Portland & Rochester	F. H. C. Tompson	David Dow	Portland, Me.
Port Dover & Lake Huron	H. M. Aldrich		Woodstock, Ont.
Port Royal & Augusta	Geo. Hiley	J. H. Milton	Port Royal, S. C.
Poughkeepsie, Hartford & Boston	John L. Driscoll		Poughkeepsie, N.Y.
Prince Edward Island	A. Stronach	D. M. Fraser	Charlotte'n, P. E.I.
Providence & Springfield	G. T. Richardson		Pascoag, R. I.
Providence & Worcester	A. Griggs	A. Griggs	Providence, R. I.
Providence, Warren & Bristol	Rufus Smith	J. Brightman	Bristol, R. I.

Q

Quebec, Mont., Ottawa & Occidental	A. Davis		Montreal, Can.
Quincy, Missouri & Pacific			Kirksville, Me.

R

Raleigh & Augusta Air-Line	**R. R. Harding		Raleigh, N. C.
Raleigh & Gaston	**R. R. Harding	R. R. Harding	Raleigh, N. C.
Rhinebeck & Connecticut	A. W. Quackenbush	John H. Decker	Rondout, N. Y.
Rich., Fredericksburg & Potomac	H. Khun	W. H. Trainham	Richmond, Va.
Richmond & Danville	See Piedmont Air-Line		
Richmond & Petersburg	John O'Brien	H. L. Carter	Richmond, Va.
Rich., York River & Chesapeake	A. B. Armstrong	A. B. Armstrong	Richmond, Va.
Rio Grande	G. W. Rendall	M. Markwood	Brownsville, Tex.
Rochester & State Line	A. J. Robbins		Rochester, N. Y.
Rock Island & Peoria	Joseph Elder		Peoria, Ill.
Rome, Watertown & Ogdensburg	Wm. H. Harris	Wm. H. Harris	Oswego, N. Y.
Rome, Georgia		O. W. Harbin	Rome, Ga.

S

Saginaw Valley & St. Louis			St. Louis, Mich.
San Francisco & Northern Pacific	Ed. Reynolds	H. C. Whiting	Donahue, Cal.
Savannah & Charleston	H. A. Ulmo	J. D. Murphy	Charleston, S. C.
Savannah, Florida & Western	‡Charles Collins	F. N. Raynal	Savannah, Ga.
Savannah & Memphis	R. A. Bridges		Opelika, Ala.
Scioto Valley	C. H. Cory	C. H. Cory	Portsmouth, O.
Seaboard & Roanoke	‡‡M. M. Pendleton		Portsmouth, Va.
Selma, Rome & Dalton	H. J. Sitton	W. W. Pierce	Selma, Ala.
Selma, Marion & Memphis	J. M. Levis		Marion, Ala.
Sheboygan & Fond du Lac	John Hickey	John Hickey	Sheboygan, Wis.
Shenango & Allegheny	Edw. Richardson		Greenville, Pa.
Shepaug	C. M. Allen		Litchfield Ct.
Sioux City & Dakota	J. H. Moulton		Yankton, Dak.
Sioux City & Pacific	C. H. Foster	C. H. Foster	Missouri Valley, Ia.
Sioux City & St. Paul	F. C. Butterfield	F. C. Butterfield	Shakopee, Minn.
Southern Pacific			
Northern Division	J. T. Wilson	F. N. Bellisle	San Francisco, Ca.
Los Ang-les & Yuma Div	Jas. Velsir	J. S. Young	Los Angeles, Cal.
Tulare Division	S. Johnson		Tulare, Cal.
South Carolina	‡P. J. Cochrane	Geo. H. Gramling	Charleston, S. C.
Southern Central	Chas. G. Brown	H. Mooney	Auburn, N. Y.
Southern Minnesota	J. B. Heuney	J. B. Heuney	Hokah, Minn.
South Pacific Coast	Martin Carter	Martin Carter	Newark, Cal.

Railroad.	*Master Mechanic.*	*Master Car Builder.*	*Residence.*
Southwestern of Georgia	D. M. Gugel	James A. Knight	Macon, Ga.
Spartanburg, Union & Columbia	Wm. Platt	W. B. Brown	Spartanburg, S. C.
Spartanburg & Asheville	Wm. Platt	W. B. Brown	Spartanburg, S. C.
Springfield, Athol & Northeastern	W. E. Granger		Springfield, Mass.
Springfield Southern	F. W. Johnstone		Springfield, O.
State Line & Sullivan	J. O. Blight		Towanda, Pa.
Stockton & Copperopol s	John M. Fulton		Stockton, Cal.
Stonington & Providence	J. H. Anderson	J. H. Anderson	Providence, R. I.
St. Croix & Penobscot	G. H. Cowen	E. J. Fuller	Milltown, Me.
St. Johns	Jas. M. Owens		St. Augustine, Fla.
St. Joseph & Western	E. Sleppy	E. Sleppy	So. St. Joseph, Mo.
St. Lawrence & Ottawa	Calvin Dame	Calvin Dame	Prescott, Canada.
St. Louis, Iron Mount. & So	**O. A. Haynes	Oscar Doolittle	St. Louis, Mo.
Arkansas Division	L. Finlay	L. Finlay	Little Rock, Ark.
Missouri Division	W. H. Harris		De Soto, Mo.
St. Louis, Alton & Terre Haute	**Beriah Warren		St. Louis, Mo.
St. Louis, Salem & Little Rock	Thomas Everson	A. W. Grosvernor	Steelville, Mo.
St. Louis & San Francisco	M. Kearney		N. Springfield, Mo.
St. Louis, Kansas City & Northern	W. H. Selby	C. S. Buck	Moberly, Mo.
St. Louis, Keokuk & Northwest'n	Wm. Foley		Keokuk, Iowa.
St. Paul & Duluth	W. McFarland	John Hill	St. Paul, Minn.
St. Paul, Minneapolis & Manitoba	J. C. Munro	J. C. Munro	St. Paul, Minn.
St. Paul & Sioux City	F. C. Butterfield	F. C. Butterfield	Shakopee, Minn.
Sussex	E. H. Osborn	R. L. Sutton	Newton, N. J.
Syracuse, Binghamton & N. Y.	James Buchanan	James Buchanan	Syracuse, N. Y.
Syracuse, Chenango & New York	Geo. W. West		Syracuse, N. Y.

T

Tennessee & Pacific	William McKeand	William McKeand	Nashville Tenn.
T. H. & Indianapolis	§§C. R. Peddle	E. D. Carter	Terre Haute, Ind.
Indianapolis Div.	Clinton Idler		Indianapolis, Ind
Vandalia Div.	Chas. Butler		Effingham, Ill.
Logansport Division	A. J. Prescott	H. L. Clark	Logansport, Ind.
Texas & New Orleans	E. A. Campbell		Houston, Texas.
Texas & Pacific	H. J. Small	F. M. Alexander	Marshall, Texas.
Tioga & Elmira State Line	Pere Bonny	D. H. Stratton	Blossburg, Pa.
Toledo, Delphos & Burlington	Geo. H. Tier		Delphos, O.
Toledo, Peoria & Western	W. O. Hewitt	R. M. Hemphill	Peoria, Ill.
Toronto, Grey & Bruce	†David Preston		Toronto, Can.
Toronto & Nipissing	J. Haggus		Toronto, Can.
Troy & Boston	Z. B. Davis	R. V. Coon	Troy, N. Y.

Directory of Railway Superintendents and Purchasing Agents

THROUGHOUT THE UNITED STATES AND CANADA.

References.—* General Manager. † Managing Director. ‡ Assistant General Superintendent. § Assistant Superintendent. ** Superintendent of Transportation. §§ Assistant General Manager.

A

Railroad.	*Superintendent.*	*Purchasing Agent.*	*Residence.*
Adirondack	C. E. Durkee		Saratoga, N. Y.
Alabama Central	John M. Bridges		Selma, Ala.
Alabama Great Southern	Chas. P. Ball	R. W. Healey	Chattanooga, Tenn.
Albany & Susquehanna	*C. F. Young		Honesdale, Pa.
Alle chany Valley	David McCargo	John L. Awl	Pittsburg, Pa.
Anderson, Lebanon & St. Louis	Jas. A. Larnerd		Anderson, Ind.
Arkansas Midland	*A. H. Johnson		Helena, Ark.
Ashtabula & Pittsburg	D. B. McCoy		Ashtabula, O.
Atchison, Topeka & Santa Fe	*W. B. Strong	F. M. Smith	Topeka, Kan.
Western Division	Geo. B. Lake		Nickerson, Kan.
Eastern Division	D. J. Chase		Topeka, Kan.
Atchison & Nebraska	L. W. Towne		Atchison, Kan.
Atchison & Nebraska	*G. H. Nettleton	G. W. P. Atkinson	Kansas City, Mo.
Atlanta & Charlotte Air Line	*G. J. Foreacre	G. J. Foreacre	Atlanta, Ga.
Atlanta & West Point	L. P. Grant		Atlanta, Ga.
Atantic & North Carolina	Jno. Hughes, Pres.		Newbern, N. C.
Atlantic, Mississippi & Ohio		J. P. Minetree	Petersburg, Va.
Atlantic, Tennessee & Ohio	J. J. Gormley		Charlotte, N. C.

B

Baltimore & Ohio	**W. M. Clements	N. S. Hill	Baltimore, Md.
Ohio & Chicago Division	C. H. Hudson		Chicago, Ill.
Pittsburg Division			Connellsville, Pa.
Baltimore & Potomac	Geo. C. Wilkins	A. W. Sumner	Baltimore, Md.
Bangor & Piscataquis	Arthur Brown		Bangor, Me.
Bath & Hammondsport	Geo. A. Sanders	Allen Wood	Hamm'dsp't, N. Y.
Bedford, Sp'gville, Owensb'g & Rd.	Jas. W. Kennedy	Jas. W. Kennedy	Bedford, Ind.
Bellefonte & Snow Shoe	Daniel Rhoads		Bellefonte, Pa.
Bell's Gap	Robert G. Ford		Bellwood, Pa.
Bennington & Rutland	F. C. White	F. C. White	Rutland, Vt.
Blairstown	J. D. Vail		Blairstown, N. J.
Boston, Revere Beach & Lynn	E. H. Whorf		Boston, Mass.
Boston & Albany	*Wm. Bliss		Boston, Mass.
Boston & Albany	C. O. Russell		Spring'd, Mass.
Boston & New York Air Line	Jos. H. Franklin		New Haven, Conn.
Boston & Providence	A. Folsom	A. A. Folsom	Boston, Mass.
Boston, Concord & Montreal	*J. A. Dodge		Plymouth, N. H.
Boston, Concord & Montreal		J. Thomas Vose	Boston, Mass.
Boston, Hoosac Tunnel & Western	E. B. Burnham		N. Adams, Mass.
Boston & Maine	J. T. Furber	M. E. Wood	Boston, Mass.
Boston & Lowell	A. A. Hobart	F. H. Nourse	Boston, Mass.
Boston, Barre & Gardner	H. M. Witter	H. M. Witter	Worcester, Mass.
Brooklyn, Flatbush & Coney Isl'd	W. E. Dorwin		Brooklyn, N. Y.
Brunswick & Albany	C. L. Schlotter		Brunswick, Ga.
Burlington & Mo. River (in Neb.)	*A. E. Touzalin	Geo. B. Harris	Omaha, Neb.
Burlington & Mo. River (in Neb.)	Geo. W. Holdrege		Lincoln, Neb.
Burlington, Cedar Rapids & Nor'n	C. J. Ives	Rob't Williams	Cedar Rapids, Ia.
Burlington & Northwestern	John F. Gerry	John F. Gerry	Burlington, Ia.
Burlington & Southwestern	J. W. Smith	J. W. Smith	Burlington, Ia.
Buffalo & Southwestern	*John F. Moulton		Buffalo, N. Y.
Buffalo, New York & Philadelphia	Geo. S. Gatchell	J. H. Pool	Buffalo, N. Y.

C

Cairo & St. Louis	*L. M. Johnson	L. M. Johnson	St. Louis, Mo.
Cairo & Vincennes	Roswell Miller	T. W. Fitch	Cairo, Ill.
California Pacific & Northern	‡J. A. Fillmore		Sacramento, Cal.
Camden & Atlantic	F. A. Lister	F. A. Lister	Camden, N. J.
Canada Central	T. A. McKinnon		Brockville, Can.
Canada Southern	*Wm. P. Taylor	A. F. Howland	St. Thomas, Ont.
U. S. Division	E. P. Murray		Toledo, O.
Canada Division	W. E. Carroll		St. Thomas, Ont.
Carbondale & Shawnestown	R. J. Cavett		Carbondale, Ill.
Carolina Central	V. Q. Johnson	C. H. Roberts	Wilmington, N. C.
Catasauqua & Fogelsville	C. W. Chapman	C. W. Chapman	Catasauqua, Pa.
Cayuga & Susquehanna	W. Stevenson		Sayre, Pa.
Cayuga & Susquehanna	W. R. Humphreys		Ithaca, N. Y.
Cazenovia, Canastota & De Ruyter	John Stebbins		Cazenovia, N. Y.
Central Pacific	*A. N. Towne		San Francisco, Cal.
Central Pacific	‡E. C. Fellows		San Francisco, Cal.
Central Pacific		J. R. Watson	Sacramento, Cal.
Western & Visalia Divisions	A. D. Wilder		Oakland, Cal.
Truckee Division	Frank Free		Wadsworth, Nev.

Railroad.	*Master Mechanic.*	*Master Car Builder.*	*Residence.*
U			
Ulster & Delaware	J. B. Dykeman	Jno. H. Decker	Rondout, N. Y.
Union Pacific	§J. H. Congdon	‡Geo. E. Stevens	Omaha, Neb.
Eastern Division		A. M. Collett	Omaha, Neb.
Eastern Division		H. P. Makely	Grand Island, Neb.
Mountain Division	T. A. Davis	John E. Davis	Cheyenne, Wy. T.
Laramie Division		Floyd Heavaner	Laramie, Wy. T.
Western Division		R. V. Brinkley	Evanston, Wy. T.
Colorado Division	James S. Scott	E. G. Thomas	Golden, Col.
Union Railway & Transit Co	H. M. Smith.		St. Louis, Mo.
Utah Central	W. B. Armstrong	Sam. S. Tucker	Salt Lake City.
Utah Western	Robert Anderson		Salt Lake City, U.
Utica & Black River	John Bailey	David James	Utica, N. Y.
Utica, Ithaca & Elmira	Geo. W. Cleveland	F. W. Magargil	Breesport, N. Y.
V			
Vicksburg & Meridian	Jas. B. Browne		Vicksburg, Miss.
Vicksburg, Shreveport & Pacific	C. H. Tull		Monroe, La.
Virginia & Truckee	I. N. Fording		Carson, Nev.
Wabash, St. Louis & Pacific	Wm. Wilson		Fort Wayne, Ind.
Wabash, St. Louis & Pacific	John C. Wills		Lafayette, Ind.
Wabash, St. Louis & Pacific	§Jacob Johann	B. B. Rose	Springfield, Ill.
Wabash, St. Louis & Pacific		U. H. Kohler	Toledo, Ohio.
Wallkill Valley	A. W. Quackenbush	Jno. H. Decker	Rondout, N. Y.
Wash. City, Va. Mid. & G. South	Jas. E. Waddey	J. T. Nalls	Alexandria, Va.
Washington & Ohio	Edward Dunn	John Harrison	Alexandria, Va.
Weiland	James Taylor	Wm. H. Pay	St. Catharine, C.W.
Westchester & Philadelphia	John Moyer	Nathan Fawling	Philadelphia, Pa.
Western & Atlantic	John H. Flynn	W. G. Grambling	Atlanta, Ga.
Western Maryland	§David Holtz	J. H. Nussear	Union Bridge, Md.
Western North Carolina	Geo. W. Gates		Salisbury, N. C.
Western, of Alabama	Robert King	F. M. Wade	Montgomery, Ala.
Western R. R. N. C.	Isaac W. Clark	Isaac W. Clark	Fayetteville, N.C
Western Union	John Taylor	E. A. Eddy	Racine, Wis.
West Feliciana	J. A. Tilton	Wm. McKelvey	Laurel Hill, La.
West Jersey	W. McAllister	C. C. Williams	Camden, N. J.
White Water	§L. W. Wingert		Harrison, O.
Wilmington, Columbia & Augusta	John Bisset	W. H. Day	Florence, S. C.
Wilmington & Weldon	John Bisset	C. R. Clowe	Wilmington, N. C.
Wisconsin Central	G. Campbell	J. L. Adam	Stevens' Pt, Wis.
Worcester & Nashua	John G. Brady	John G. Brady	Worcester, Mass.

Railroad.	*Superintendent.*	*Purchasing Agent.*	*Residence.*
Humboldt Division	G. W. Coddington		Carlin, Nev.
Salt Lake Division	A. G. Fell		Ogden, Utah.
Sacramento & Oregon Div	R. H. Pratt		Sacramento, Cal.
Central Vermont	J. W. Hobart		St. Albans, Vt.
Central Vermont	‡J. M. Foss		St. Albans, Vt.
Western Division	John Schrier		Ogdensburg, N. Y.
Central & Southern Division	Ambrose Arnold		St. Albans, Vt.
Rutland Division	J. Burdett		Rutland, Vt.
New London Northern	G. W. Bentley	G. W. Bentley	New London, Conn.
Central of Georgia	Wm. Rogers	Henry Yonge	Savannah, Ga.
Atlanta Division	W. G. Raoul		Macon, Ga.
Central of Iowa	D. N. Pickering	D. N. Pickering	Marshalltown, Ia.
Central of New Jersey	James Moore	B. W. Burnet	Elizabeth, N. J.
Central Division	W. W. Stearns		Elizabeth, N. J.
Lehich & Susq. Division	W. S. Polhemus		Mauch Chunk, Pa.
Champaign, Havana & Western	A. H. Wood		Urbana, Ill.
Charlotte, Columbia & Augusta	Jno. G. Clarke		Columbia, S. C.
Chenaug	C. H. Platt	C. H. Platt	Litchfield, Conn.
Chesapeake & Ohio	W. M. S. Dunn	J. A. Netherland	Richmond, Va.
Cheraw & Darlington	R. D. Townsend		Society Hill, S. C.
Cherokee	John Postell		Atlanta, Ga.
Cheshire	R. Stewart	H. H. Stone	Keene, N. H.
Chester & Lenoir	James Mason		Chester, S. C.
Chicago & Northwestern	*Mayo & Nuttle	R. W. Hamer	Chicago, Ill.
Chicago & Northwestern	§Chas. C. Wheeler		Chicago, Ill.
Wisconsin & Mill. Division	F. J. Cuyler		Chicago, Ill.
Peninsula Division	W. B. Lindsay		Escanaba, Mich
Madison Division	C. A. Swinefurd		Baraboo, Wis.
Galena Division	Chas. Murray		Chicago, Ill.
Des Moines & Iowa Division	J. S. Oliver		Clinton, Iowa.
Winona & St. Peter Division	S. Sanborn		Winona, Minn.
Chicago & Alton	J. C. McMullen	A. V. Hartwell	Chicago, Ill.
Chicago & Alton	‡C. H. Chappell		Bloomington, Ill.
Chicago Division	A. M. Richards		Chicago, Ill.
St. Louis Division	H. W. Stager		Alton, Ill.
Jacksonville Division	T. M. Bates		Roodhouse, Ill.
Kansas City Division	J. H. Wood		Kansas City, Mo.
Chicago & Block Coal	*A. F. Beach		Vredenburg, Ind.
Chicago, Burlington & Quincy	*Thos. J. Potter	Wm. Irving	Chicago, Ill.
Chicago, Burlington & Quincy	§John D. Besler		Galesburg, Ill.
Chicago, Burlington & Quincy	§E. Ryder		Chicago, Ill.
Chicago Division	George Alexander		Chicago, Ill.
Middle, Galesb'g & Q's Div	H. Hitchcock		Galesburg, Ill.
St. Louis & R. Isl'd Division	W. R. Crumpton		St. Louis Mo.
Iowa Division	W. C. Perkins		Burlington, Iowa.
Chi., Clinton, Dubuque & Minn	*F. O. Wyatt	F. O. Wyatt	Dubuque, Iowa.
Chicago & Eastern Illinois	O. S. Lyford	O. S. Lyford	Chicago, Ill.
Chicago & Iowa	W. H. Holcomb		Rochelle, Ill.
Chicago & Northeastern	J. M. Turner		Lansing, Mich.
Chicago & Pacific	*J. M. Whitman	James Penny	Chicago, Ill.
Chicago & Paducah	D. H. Cocklin		Streator, Ill.
Chicago & Paducah		C. L. Rising	Chicago, Ill.
Chicago, St. Louis & New Orleans	*J. C. Clarke	J. C. Febiger, Jr.	New Orleans, La.
South Division	W. P. McKinley		McComb City, Miss.
North Division	J. G. Mann		Jackson, Tenn.
Chicago, Rock Island & Pacific	A. Kimball		Davenport, Iowa.
Chicago, Rock Island & Pacific	‡A. Manvel	A. Manvel	Chicago, Ill.
Southwestern Division	G. F. Walker		Trenton, Mo.
Iowa Division	H. P. Royce		Des Moines, Iowa.
Keokuk & Des Moines Div	John Givin		Keokuk, Ia.
Chicago & West Michigan	*Geo. C. Kimball	H. Park	Muskegon, Mich.
Chicago & West Michigan	C. M. Lawler		St. Joseph, Mich.
Chicago, Milwaukee & St. Paul	W. C. Van Horne	J. T. Crocker	Milwaukee, Wis.
Ch., LaCrosse & P. du C. Div	H. C. Atkins		Milwaukee, Wis.
Northern Division	L. B. Rock		Milwaukee, Wis.
I. & M. & I. D. Division	C. H. Prior		Minneapolis, Minn.
Wabasha Division	J. H. Lakey		Wabasha, Minn.
Western Union Division	D. A. Olin		Racine, Wis.
Chicago, Pekin & Southwestern	J. Murray	C. L. Rising	Chicago, Ill.
Chicago, St. Paul & Minneapolis	E. W. Winter		Hudson, Wis.
Chicago & West Michigan	*Geo. C. Kimball	H. Park	Muskegon, Mich.
Chippewa Falls & Western	L. C. Stanley		Chip'wa Falls, Wis.
Cincinnati & Eastern	George H. Wilber		Batavia, O.
Cincinnati, Wabash & Michigan	*Norman Beckley	Norman Beckley	Elkhart, Ind.
Cincinnati, Richmond & Chicago	Lewis Williams		Cincinnati, O.
Cincinnati, Rockp't & Southwest'n	H. C. Branham	H. C. Branham	Rockport, Ind.
Cincinnati & Terre Haute	John Holland		Terre Haute, Ind.
Cin., Cumber'd Gap & Charleston	W. J. Taylor		Knoxville, Tenn.
Cincinnati, Hamilton & Dayton	Lewis Williams	Lewis Williams	Cincinnati, O.
Cin., Hamilton & Indianapolis	Lewis Williams		Cincinnati, O.
Cincinnati, Lafayette & Chicago	J. W. Sherwood		Cincinnati, Ohio.
Cin., Sandusky & Cleveland	*D. W. C. Brown	Frank Herriman	Sandusky, O.
Cin., Sandusky & Cleveland	Chas. Howard		Sandusky, O.
Cincinnati Southern	Sam'l Woodward	C. M. Woodward	Cincinnati, O
Cin., Indianapolis, St. Louis & Chi	J. W. Sherwood		Indianapolis, Ind.
Cin., Indianapolis, St. Louis & Chi		George Fozzer	Cincinnati, O.
Cleve., Col., Cin. & Indianapolis	*E. B. Thomas	J. L. Yale	Cleveland, O.
Indianapolis Division	C. C. Gale		Indianapolis, Ind.
Col. and Cincinnati Divs	Robert Blee		Cleveland, O.

Railroad	Superintendent.	Purchasing Agent.	Residence.
Cleveland & Pittsburg	John Thomas		Cleveland, O.
Cleveland & Pittsburg	*J. D. Layng	Wm. Mullins	Pittsburgh, Pa.
Cleveland, Mt. Vernon & Columb's	G. A. Jones		Mt. Vernon, O.
Cleve., Tuscarawas Val. & Wheel.	*Oscar Townsend		Cleveland, O.
Cobourg, Petersboro & Marmora	James R. Barber	J. R. Barber	Cobourg, Ont.
Columbus & Hocking Valley	Orland Smith		Columbus, O.
Columbus & Toledo	Orland Smith	Geo. R. Carr	Columbus, O.
Columbus & Rome	T. J. Nuckolls		Columbus, Ga.
Concord & Claremont	George E. Todd		Concord, N. H.
Concord	H. E. Chamberlin	H. E. Chamberlin	Concord, N. H.
Concord & Portsmouth	H. E. Chamberlin		Concord, N. H.
Connecticut Central	D. D. Warren, Pres		Springfield, Mass.
Connecticut River	John Mulligan	John Mulligan	Springfield, Mass.
Connecticut Valley	Samuel Babcock		Hartford, Conn.
Connecticut Western	J. F. Jones		Hartford, Conn.
Connecticut & Passumpsic Rivers	H. E. Folsom		Lyndonville, Vt.
Corning, Cowanesque & Antrim	A. H. Gorton		Corning, N. Y.
Covington, Col. & Black Hills	J. J. Booge		Sioux City, Iowa.
Cumberland Valley	J. F. Boyd	O. N. Lull	Chambersburg, Pa.
Cumberland & Pennsylvania	P. L. Burwell	P. L. Burwell	Cumberland, Md.
Cumberland & Maurice River	L. H. Dowdney		Port Norris, N. Y.

D

Danbury & Norwalk	L. W. Sandiforth		South Norwalk, Ct.
Danville & Southwestern	James A. Eads		Paris, Ill.
Davenport & Northwestern	D. Flanigan		Davenport, Ill.
Dayton, Covington & Toledo	*J. O. Arnold	C. C. Kneisly	Dayton, O.
Dayton & Michigan	J. H. Weller		Dayton, O.
Dayton & Union	C. C. Gale		Indianapolis, Ind.
Dayton & Southeastern	J. E. Gimperling, Rec		Dayton, O.
Delaware & Chesapeake	O. S. Sanford		Easton, Md.
Delaware & Hudson Canal Co	R. Manville	J. White Sprong	Albany, N. Y.
Delaware & Hudson Canal Co	*C. F. Young		Honesdale, Pa.
Albany & Susq. Division	C. D. Hammond		Albany, N. Y.
Rensselaer & Saratoga Div	Theo. Voorhees		Troy, N. Y.
Delaware, Lackawanna & Western		G. W. B. Cushing	New York City.
Delaware, Lackawanna & Western	W. F. Hallstead		Scranton, Pa.
Bloomsburg Division	G. Bogart		Scranton, Pa.
Morris & Essex Division	Andrew Reasoner		Hoboken, N. J.
Oswego & Syracuse Division	W. B. Phelps		Oswego, N. Y.
Utica, Chenango & Sus. Div	W. G. Oakman		Scranton, Pa.
Delaware Western	David Cunnell		Wilmington, Del.
Denver & Rio Grande	S. R. Ainslie	S. R. Ainslie	Denver, Col.
Denver, South Park & Pacific	C. W. Fisher	Charles Wheeler	Denver, Col.
Des Moines, Adel & Western	C. N. Gilmore		Adel, Iowa.
Des Moines & Ft. Dodge	C. N. Gilmore	C. N. Gilmore	Des Moines, Ill.
Detroit & Bay City	S. R. Callaway	Allan Bourn	Detroit, Mich.
Detroit, Gr. Haven & Milwaukee	W. J. Morgan	John S. Lorimer	Detroit, Mich.
Detroit, Hillsdale & Southwestern	W. F. Parker		Ypsilanti, Mich.
Detroit, Lansing & Northern	J. B. Mulliken	Allan Bourn	Detroit, Mich.
Dorchester & Delaware	M. Murphy		Cambridge, Md.
Dunkirk, Allegheny Val. & Pitts	D. Thayer	C. V. Deforest	Dunkirk, N. Y.
Dunkirk, Allegheny Val. & Pitts			New York City.

E

East Broad Top	A. W. Sims		Orbisonia, Pa.
East Alabama & Cincinnati	W. W. Barnes		Opelika, Ala.
East Line & Red River	W. B. Ward		Jefferson, Tex.
East Tenn., Virginia & Georgia	**J. F. O'Brien	J. F. O'Brien	Knoxville, Tenn.
Eastern	**D. W. Sanborn	Geo. J. Fisher	Boston, Mass.
Eastern Kentucky	H. W. Bates	H. W. Bates	Riverton, Ky.
Eastern Kentucky	Geo. Noble		Riverton, Ky.
Eastern Shore	W. Thompson		Prince Anne, Md.
Erie & Pittsburg	J. M. Kimball		Erie, Pa.
Erie & Pittsburg	*J. D. Layng	Wm. Mullins	Pittsburg, Pa.
Eureka & Palisade	F. Evarts		Palisade, Nev.
European & North American	F. W. Wentworth		Bangor, Maine.
Evansville & Terra Haute	J. E. Martin	Jno. L. White	Evansville, Ind.
Evansville, Terra Haute & Chi	Jos. Collett	W. D. Macfarland	Terra Haute, Ind.

F

Fitchburg	John Adams	F. S. Pratt	Boston, Mass.
Ft. Vermont & Mass. Div	E. K. Turner		Fitchburg, Mass.
Flint & Pere Marquette	Sanford Keeler	G. G. Cook	E Saginaw, Mich.
Florida Central	W. M. Davidson	W. M. Davidson	Jacksonville, Fla.
Flushing, North Shore & Central	Samuel Spencer	Samuel Spencer	Lg Isl'd Cy, N. Y.
Fonda, Johnstown & Gloversville	L. Caten		Gloversville, N. Y.
Fon du Lac, Amboy & Peoria	A. Kinyon		Fond du Lac, Wis.
Fort Madison & Northwestern	S. B. Kenrick	S. B. Kenrick	Fort Madison, Ia.
Fort Wayne & Jackson	M. D. Woodford	H. A. Raymond	Jackson, Mich.
Fort Wayne, Muncie & Cincinnati	W. W. Worthington	& P. Ag't.	Fort Wayne, Ind.
Foxburg, St. Petersburg & Clarion	Benj. B. Vernon		Foxburg, Pa.
Frankfort & Kokomo	E. Y. Comstock		Frankfort, Ind.
Fredericton	F. B. Edgecombe		Fredericton, N. B.
Freehold & New York	J. E. Ralph		Freehold, N. J.

G

Gal., Harrisburg & San Antonio	James Converse		Houston, Texas.
Gal., Houston & Henderson	*H. M. Hoxie	H. M. Hoxie	Palestine, Texas.
Geneva, Ithaca & Sayre	Wm. Stevenson		Sayre, Pa.
Georgia	S. K. Johnson	S. K. Johnson	Augusta, Ga.
Grand Haven	*F. H. May	F. H. May	Allegan, Mich.
G. Rapids, Newaygo & L. Shore	C. Warner		G. Rapids, Mich.
Grand Rapids & Indiana	W. O. Hughart, Prest	W. R. Shelby.	G. Rapids, Mich.
Northern Division	J. M. Northern		G. Rapids, Mich.
Southern Division	P. S. O'Rourke		Fort Wayne, Ind.
Grand Trunk	*J. Hickson	John Taylor	Montreal, Canada
Grand Trunk	W. J. Spicer		Montreal, Canada.
Grand Tower & Carbondale	T. M. Williamson	Wm. W. Harris	Grand Tower, Ill.
Grayville & Mattoon	*G. L. Bradbury		Mattoon, Ill.
Grayville & Mattoon	G. R. Coolsleigh		Mattoon, Ill.
Great Western (Canada)	Charles Stiff		Hamilton, Ont.
Great Western (Canada)		G. R. Nash	London, Ont.
Green Bay & Minnesota	*Timothy Case		Green Bay, Wis.
Greenville & Columbia	Major R. H. Temple		Columbia, S. C.
Greenville, Col. & Birmingham	E. P. Bull		Greenville, Miss.
Greenwich & Johnsonville	H. H. Wagner		Greenwich, N. Y.
Gulf, Colorado & Santa Fe	O. H. Dorrance		Galveston, Texas.
Gulf, Western Texas & Pacific	M. D. Monserrate		Cuero, Texas.

H

Hamilton & Northwestern	*F. W. Cumberland		Hamilton, Ont.
Hannibal & St. Joseph	W. H. Woodward, J.	T. L. Dunn	Hannibal, Mo.
Hannibal & St. Joseph	W. H. Woodward		Hannibal, Mo.
Eastern Division			Hannibal, Mo.
Western Division	W. C. Alberger		Kansas City, Mo.
Hanover Junction & Gettysburg	Henry A. Young		Hanover, Pa.
Harlem Extension South	*R. C. Root		Bennington, Vt.
Havana, Rantoul & Eastern	H. E. Bullock	H. E. Bullock	Rantoul, Ill.
Housatonic	L. B. Stiles	D. L. Draper	Bridgeport, Conn.
Houston, East & West Texas	E. Hulbert		Houston, Texas.
Houston & Texas Central	A. H. Swanson	A. H. Swanson	Houston, Texas.
Southern Division	M. G. Howe		Houston, Texas
Northern Division	G. A. Quinlan		Corsicana, Texas.
Huntingdon & Broad Top	Geo. F. Gage	S. B. Knight.	Huntingdon, Pa.

I

Illinois Central	E. T. Jeffrey	O. Ott	Chicago, Ill.
Chicago Division	C. A. Beck		Centralia, Ill.
Northern Division	J. C. Jacobs		Amboy, Ill.
Iowa Division	D. W. Parker		Dubuque, Ia.
Springfield Division	T. J. Hudson		Springfield, Ill.

Railroad	Superintendent.	Purchasing Agent.	Residence.
Illinois Midland	D. K. Smith	J. G. Clifford	Paris, Ill.
Illinois & St. Louis	C. H. Sharman		St. Louis Mo.
Indiana, Bloomington & Western	I. D. Barton	H. C. Norton	Indianapolis, Ind.
Indianapolis, Decatur & Spring.	H. S. Morse		Indianap'ls, Ind.
Indianapolis & St. Louis	E. B. McClure	H. W. Comstock	Indianapolis, Ind.
Indianapolis, Peru & Chicago	§§E. C. Murphy		Indianapolis, Ind.
Indianapolis, Peru & Chicago		John Mc Kenna	Peru, Ind.
Intercolonial	D. Pottinger	L. B. Archibald	Moncton, N. B.
Halifax & St. John Division	Jas. Coleman		Truro, N. S.
Northern Division	M. Busby		Campbell'n, N. B.
International & Great Northern	H. M. Hoxie	H. M. Hoxie	Galveston, Texas.
Iowa Eastern	H. H. Kerr		Beulah, Iowa.

J

Jacksonville, N. Western & S. E.	E. S. Greenleaf		Jacksonville, Ill.
Jacksonville, Pen. & Mobile	J. D. Hollister	J. D. Hollister	Tallahassee, Fla.
Jeff., Madison & Indianapolis	Jas. R. Shaler	Wm. Mullins	Pittsburg, Pa.
Jeff., Madison & Indianapolis	*D. W. Caldwell		Columbia, Ohio.
Junction & Breakwater	Tho. Grome		Lewes, Del.

K

Kansas Central	W. A. Martin	W. A. Martin	Leavenworth, Kan.
Kan. City, Burlington & Santa Fe	James Houston		Burlington, Kan.
Kansas City, Fort Scott & Gulf	*Geo. A. Nettleton		Kansas City, Mo.
Kansas City, Fort Scott & Gulf	T. F. Oakes	G. W. P. Atkinson	Kansas City, Mo.
Kansas City, Lawrence & South	*G. H. Nettleton	G. W. P. Atkinson	Kansas City, Mo.
Kansas City, Lawrence & South	T. F. Oakes		Kansas City, Mo.
Kan. City, St. Joseph & C. Bluffs	J. F. Barnard		St. Joseph, Mo.
Kan. City, St. Joseph & C. Bluffs	*G. H. Nettleton	G. W. P. Atkinson	Kansas City, Mo.
Kansas City & Eastern	H. Hale		Independence, Mo.
Kansas Pacific	*S. H. H. Clark	A. D. Clark	Omaha, Neb.
Kansas Pacific	S. T. Smith		Kansas City, Mo.
Kaw Valley Division	J. O. Brinkerhoff		Kansas City, Mo.
Smoky Hill Division	J. T. Odell		Ell's, Kansas.
Denver Division	J. T. Odell		Denver, Col.
Cheyenne Division	A. A. Egbert		Denver, Col.
Kent Co. & Smyrna & Del. Bay	J. F. Bingham		Chestertown, Md.
Kentucky Central	J. R. Ledyard		Covington, Ky.
Kingston & Pembroke	B. W. Folger	Wm. Harty	Kingston, Can.
Knox & Lincoln	C. A. Coombs	C. A. Coombs	Bath, Maine.
Knoxville & Ohio	G. J. Kinzel		Knoxville, Tenn.

L

Lake Erie & Western	*E. H. Waldron	E. H. Andrews	Lafayette, Ind.
Eastern Division	Geo. G. Hadley		Fremont, Ohio.
Western Division	D. S. Hill		Lafayette, Ind.
Lake Ontario Southern	*Jas. E. Briggs		Newark, N. Y.
Lake Shore & Mich. Southern	*John Newell		Cleveland, Ohio.
Lake Shore & Mich. Southern	Charles Paine	A. C. Armstrong	Cleveland, Ohio.
Buffalo & Erie Division	C. B. Couch		Cleveland, Ohio.
Toledo Division	Thos. Flesher, Jr		Cleveland, Ohio.
Michigan Division	J. E. Curtis		Toledo, Ohio.
Detroit Division	P. S. Blodgett		Detroit, Mich.
Western Division	J. H. Parsons		Chicago, Ill.
Lansing Division	T. J. Charlesworth		Lansing, Mich.
Franklin Division	Geo. H. McIntire		Stoneboro, Pa.
Lehigh Valley	Robert H. Sayre		Bethlehem, Pa.
Lehigh Valley		L. Chamberlin	Philadelphia, Pa.
Beaver Meadow Division	A. G. Brodhead, Jr		Mauch Chunk, Pa.
Mahanoy Division	James I. Blakslee		Mauch Chunk, Pa.
New Jersey Division	H. E. Packer		Metuchen, N. J.
Wyoming Division	A. Mitchell		Wilkesbarre, Pa.
Lewis & Kennebec	W. C. Hall		Quebec, Can.
Ligonier Valley	Thos. A. Mellon		East Liberty, Pa.
Little Rock & Fort Smith	T. Hartman		Little Rock, Ark.
Little Rock, Miss. River & Texas	A. A. Woodson	J. A. Woodson	Pine Bluff, Ark.
Los Angeles & Independence	§W. J. L. Moulton		Los Angeles, Cal.
Long Island	T. R. Sharp, Rec	R. M. Galloway	Lg Isla'd Cy, N.Y.
Louisville & Nashville	*F. de Funiak		Louisville, Ky.
Louisville & Nashville	D.W. C. Rowland	G. C. Breed	Louisville, Ky.
Memphis Line	Jas. Montgomery		Bowling Green, Ky.
Nashville & Decatur Div	James Geddes		Nashville, Tenn.
So. & North Ala. Division	B. Dunham		Birmingham, Ala.
Louisville, Cincinnati & Lexington	Wm. Mahl	Wm. Mahl	Louisville, Ky.
Louisville, New Albany & Chicago	J. MacLeod	Wm. M. Lewis	New Albany, Ind.
Louisville, N. Albany & St. Louis	E. Newland, Pres		New Albany, Ind.

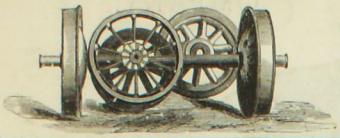
M

Macon & Brunswick	Geo. W. Adams	W. C. Jones	Macon, Ga.
Maine Central	Payson Tucker		Portland, Me.
Manchester & Keene	Charles E. Paige		Nashua, N. H.
Manchester & Lawrence	H. E. Chamberlin		Concord, N. H.
Manchester & North Weare	H. E. Chamberlin		Concord, N. H.
Manhattan Elevated		M. K. King	New York, N. Y.
Manhattan Elevated	§§Frank K. Hall		New York, N. Y.
Eastern Division	Robert Stewart		New York, N. Y.
Western Division			New York, N. Y.
Marietta & Cincinnati	Jas. H. Stewart	Harry McKee	Cincinnati, O.
Marietta, Pittsburg & Cleveland	S. C. Baldwin	R. B. Hoover	Marietta, O.
Marquette, Houghton & Ontonag'n	*Samuel Schoch		Marquette, Mich.
McKean & Buffalo	S. V. Golden		Smethport, Pa.
Memphis & Little Rock	*Rudolph Fink		Memphis, Tenn.
Memphis & Little Rock	W. E. Smith		Memphis, Tenn.
Memphis & Charleston	John A. Grant	John A. Grant	Huntsville, Ala.
Memphis, Paducah & Northern	*N. Monsarrat	N. Mouserrat	Paducah, Ky.
Michigan Air Line	*M. S. Hadley		Romeo, Mich.
Michigan Central	*H. B. Ledyard	Allan Bourn	Detroit, Mich.
Michigan Central	E. C. Brown		Jackson, Mich.
Mackinaw & Saginaw Div	W. A. Vaughan		Bay City, Mich.
Main Ln & G. R. & Kal. Div's	C. B. Bush		Jackson, Mich.
Middleburg & Schoharie	P. S. Denforth		Middleburg, N.Y.
Middletown & Crawford	D. Thompson		Thompson, Ridge, N.Y.
Midland Railway of Canada	H. G. Taylor		Port Hope, Ont.
Milwaukee, Lake Shore & West'n	H. H. Reed		Milwaukee, Wis.
Mineral Point	G. W. Cobb	G. W. Cobb	Mineral Point, Wis.
Mineral Range	*C. E. Holland		Hancock, Mich.
Minneapolis & St. Louis	*Chas. F. Hatch	Chas. F. Hatch	Minneapolis, Minn.
Minneapolis & St. Louis	E. W. Gaylord	E. W. Gaylord	Minneapolis, Minn.
Minnesota Midland	J. H. Lakey		Wabasha, Minn.
Mississippi & Tennessee	M. Burke	M. Burke	Memphis, Tenn.
Missouri, Iowa & Nebraska	Col. Henry Hill	J. FitzHenry	Alexandria, Mo.
Missouri, Kansas & Texas	*Abram Mitchell	G. M. Babcock	Sedalia, Mo.
Sedalia, Ft. S. & Neosho Div.	L. Pearson		Sedalia, Mo.
Cherokee & Choctaw Div	E. Harding		Denison, Tex.
Missouri Division	Geo. H. Huntington		Hannibal, Mo.
Fort Scott Division	L. Pearson		Sedalia, Mo.
Missouri Pacific	A. A. Talmage	R. B. Lyle	St. Louis, Mo.
Missouri Pacific	†A. W. Dickinson		St. Louis, Mo.
Eastern Division	Miller Bullard		St. Louis, Mo.
Central Branch Division	W. W. Fagan		Mobile, Ala.
Mobile & Alabama Grand Trunk	F. B. Clark, Prest		Mobile, Ala.
Mobile & Ohio	*A. L. Rives	A. L. Rives	Jackson, Tenn.
Northern Division	E. S. Hosford		Nobile, Ala.
Southern Division	C. Fleming		Columbus, Ga.
Mobile & Girard	W. L. Clark		Montgomery, Ala.
Mobile & Montgomery	B. Dunham		Mont Alto, Pa.
Mont Alto	G. B. Welsting		Macon, Ga.
Montgomery & Eufaula	W. G. Raoul		Montpelier, Vt.
Montpelier & Wells River	W. A. Stowell		Mauch Chunk, Pa.
Montrose	J. I. Blakeslee	J. I. Blakeslee	New Orleans, La.
Morgan's Louisiana & Texas	Geo. Pandeley	C. A. Whitney & Co	Hughesville, Pa.
Muncy Creek	H. R. Mehrling		

Railroad.	Superintendent.	Purchasing Agent.	Residence.
N			
Nashua, Acton & Boston	H. E. Chamberlin		Concord, N. H
Nashua & Lowell	Chas. E. Paige	Chas. E. Paige	Nashua, N. H.
Nashville, Chattanooga & St. Louis	J. W. Thomas		Nashville, Tenn.
St. Louis Division	E. Culverhouse		St. Louis, Mo
Natchez, Jackson & Columbus	J. H. Fitzpatrick		Natchez, Miss.
Naugatuck	Geo. W. Beach	Geo. W. Beach	Waterbury, Conn.
Nebraska	Wm. Irving		Omaha, Neb.
Newburg, Dutchess & Connecticut	C. L. Kimball	C. L. Kimball	Dutchess J'n, N.Y.
New Brunswick & Canada	John Stewart		St. Stephen, N. B.
New Brunswick	Tho. Hoben	T. Burpee	Gibson, N. B.
New Canaan	Wm. St. John		New Canaan, Conn.
New Castle & Franklin	A. Vandivort		New Castle, Pa.
New Haven & Derby	E. S. Quintard		New Haven, Conn.
New Haven & Northampton	C. N. Yeamans	C. N. Yeamans	New Haven, Conn.
New Jersey & New York	J. D. Hasbrouck		Jersey City, N. J.
New Jersey Midland	W. E. Lewis		Jersey City, N. J.
New Jersey Southern	W. S. Sneden		119 Lib. st., N. Y.
New Orleans & Selma	T. H. Du Puy		Selma, Ala.
New Orleans & Mobile	D. B. Robinson	John J. Howell	New Orleans, La.
New York, Lake Erie & Western	*Robert Harris		New York, N. Y.
New York, Lake Erie & Western	E. S. Bowen	J. A. Hardenbergh	New York, N. Y.
New York, Lake Erie & Western	†O. Charute		New York, N. Y.
New York, Lake Erie & Western	**P. P. Wright		Jersey City, N. J.
Eastern Division	E. O. Hill		Port Jervis, N. Y.
Delaware Division	Benj. Thomas		Port Jervis, N. Y.
Susquehanna Division	R. B. Cable		Elmira, N. Y.
Buffalo & Rochester Div	R. G. Taylor		Buffalo, N. Y.
Western Division	J. S. Beggs		Dunkirk, N. Y.
New York & Harlem	Chas. M. Bissell	R. C. Moore	New York, N. Y.
New York & Greenwood Lake	C. W. Douglas	C. W. Douglas	Jersey City, N. J.
New York, New Haven & Hartford	E. M. Reed	R. N. Dowd	New Haven, Conn.
N. Y. & N. H Division	John T. Moody		New York, N. Y.
Hartford Division	C. S. Davidson		Hartford, Conn.
Shore Line Division	W. H. Stevenson		New Haven, Conn.
New York Central & Hudson Riv			
Hudson River & Harlem Div	J. M. Toucey	C. V. DeForest	New York, N. Y.
Eastern Division	Zenas C. Priest		Utica, N. Y.
Western Division	Geo. H. Burrows		Rochester, N. Y.
New York Central Division	Jas. Tillinghast		Albany, N. Y.
New York & Manhatan Beach			New York, N. Y.
New York & New England	*Jas. H. Wilson	W. W. McKim	Boston, Mass.
Eastern Division	H. M. Britton		Boston, Mass.
Norwich Division	P. St. M. Andrews		Norwich, Conn.
Western Division	J. T. McManus		Hartford, Conn.
New York, Ontario & Western	*Theo. H. nston		New York, N.Y.
Northern Division	C. W. Lanpher		Norwich, N. Y.
Southern Division	A. H. Dauchy		Middletown, N. Y.
New York, Penn. & Ohio	P. D. Cooper		Cleveland, O.
New York, Penn. & Ohio		J. H. Holway	Meadville, Pa.
First & Second Divisions	A. L. Dunbar		Meadville, Pa.
Third and Fourth Divisions	T. A. Phillips		Meadville, Pa.
Mahoning Division	J. M. Ferris		Galion, O.
Northern Pacific	*H. C. Sargent	E. T. Williams	Cleveland, O.
Northern Pacific	H. A. Towne		St. Paul, Minn.
Northern of Canada	*F. W. Cumberland		Brainerd, Minn.
North Carolina	See Piedmont Air-Line.		Toronto, Can.
Northern Central	*Frank Thomson		
Northern Central		A. W. Sumner	Philadelphia, Pa.
Baltimore Division	G. C. Wilkins		Baltimore, Md.
Elmira & Canandaigua Div	R. Neilson		Baltimore, Md.
Susquehanna Division	W. A. Baldwin		Elmira, N. Y.
Northern (New Hampshire)	George F. Todd		Williamsport, Pa.
Northeastern (Georgia)	James M. Edwards		Concord, N. H.
Northeastern (South Carolina)	A. F. Ravenel		Athens, Ga.
North Pacific Coast	*John W. Doherty	W. F. Russell	Charlest n, S. C.
Northwestern Ohio	J. S. Morris		San Francisco, Cal
Northwestern & Grand Trunk	Henry Funnell		Toledo, O.
Northwestern & Grand Trunk			Battle Creek, Mich
		N. Wall	Port Huron, Mich
O			
Ogdensburg & Lake Champlain	W. W. Hungerford		Ogdensburg, N. Y.
Ohio Central	P. Peasc		Columbus, O.
Ohio & Mississippi	W. W. Peabody		Cincinnati, O.
Ohio & Mississippi		G. E. Atwood.	St. Louis, Mo.
Eastern Division	C. B. Cole		Seymour, Ind.
Western Division	C. M. Stanton		St. Louis, Mo.
Louisville Division	C. Cole		Louisville, Ky.
Ohio & Toledo	N. A. Smith		Carrollton, O.
Old Colony	J. R. Kendrick	F. P. Moseley	Boston, Mass.
Northern Division	§S. A. Webber		Fitchburg, Mass.
Cape Cod Division	§C. H. Nye		Hyannis Mass.
Main Line Division	§J. H. French		Boston, Mass.
Olean, Bradford & Warren	J. W. Watson		Olean, N. Y.
Omaha & Republican Valley	J. J. Stoils		Omaha, Neb.
Omaha & Northern Nebraska	J. E. House		Omaha, Neb.
Oregon & California	J. Brandt, Jr.	J. Brandt, Jr.	Portland, Oregon.
Oregon Steam Navigation Co	G. J. Ainsworth		Portland, Oregon.
Owensboro & Nasoville	E. Culverhouse		Owensboro, Ky.
P			
Paducah & Elizabethtown	Robert Meek		Elizabethtown, Ky.
Painesville & Youngstown	**J. A. Newcome	M. R. Martin	Youngstown, O.
Panama	B. Mozley		Aspinwall, U. S. C.
Parker & Karns City	W. C. Moberly		Parker City, Pa.
Peach Bottom	S. M. Manifold		York, Pa.
Paw Paw & Toledo & South Haven	John Ihinz		Lawton, Mich.
Pennsylvania	*Frank Thomson	Enoch Lewis	Philadelphia, Pa.
Pennsylvania	Charles E. Pugh		Altoona, Pa.
Pennsylvania	**John Reilly		Altoona, Pa.
New York Division	James McCrea		Jersey City, N. J.
Amboy Division	I. S. Buckelew		Camden, N. J.
Belvidere Division	J. A. Anderson		Lambertville, N. J.
New Jersey Division	F. Wolcott Jackson		Jersey City, N. J.
Philadelphia Division	W. F. Lockard		Philadelphia, Pa.
Middle Division	S. M. Prevost		Harrisburg, Pa.
Pittsburg Division	Robert Pitcairn		Pittsburg, Pa.
Tyrone Division	S. S. Blair		Tyrone, Pa.
Bedford Division	P. F. Smith		Harrisburg, Pa.
West Pennsylvania Division	E. B. Taylor		Allegheny City, Pa.
Lewistown Division	J. H. Hutchinson		Lewistown, Pa.
Pensacola	W. D. Chipley		Pensacola, Fla.
Pensacola & Selma	W. D. Chipley		Pensacola, Fla.
Peoria, Decatur & Evansville	G. R. Cobleigh	G. R. Cobleigh	Pekin, Ill.
Peoria, Pekin & Jacksonville	*Geo. Skinner	Geo. Skinner	Peoria, Ill.
Peoria & Springfield	J. R. Hilliard		Peoria, Ill.
Petersburg	R. Sully	L. E. Clark	Petersburg, Va.
Philadelphia & Atlantic City	Ellis Clark	Ellis Clark	Philadelphia, Pa.
Philadelphia & Reading	*J. E. Wootten	W. S. Wilson	Philadelphia, Pa.
Catawissa & Williamsport Br.	D. C. Reinhart		Williamsport, Pa.
Reading & Columbia	Alex. M. Wilson		Columbia, Pa.
Lebanon & Tremont	H. W. Tracy		Pine Grove, Pa.
N. Penn. & B. Brook Divis'n.	E. A. Sweigard		Philadelphia, Pa.
Philadelphia & Baltimore Central	Henry Wood	Henry Wood	Philadelphia, Pa.
Philadelphia & Erie	Wm. A. Baldwin		Williamsport, Pa.
Philadelphia & Erie		Enoch Lewis	Philadelphia, Pa.
Western Division	J. W. Reynolds		Erie, Pa.
Middle Division	E. B. Westfall		Renovo, Pa.
Eastern Division	Thomas Gucker		Williamsport, Pa.
Danv., Haz. & W. Barre Div	Joseph Crawford		Sunbury, Pa.
Philadelphia, Wilmington & Balt	H. F. Kenney		Philadelphia, Pa.
Philadelphia, Newt'n & New York	L. L. Bush		Philadelphia, Pa.

Railroad.	Superintendent.	Purchasing Agent.	Residence.
Piedmont Air-Line	T. M. R. Talcott	R. H. Duesberry	Richmond, Va.
Richmond & Danville Div	W. A. Green		Richmond, Va.
North Carolina Division	A. B. Andrews		Raleigh, N. C.
Pine River Valley & Stevens Pt	N. L. James		Richl'nd Cent., Wis.
Pittsburg & Castle Shannon	A. C. Hays		Pittsburg, Pa.
Pittsburg & Lake Erie	R. W. Jones		Pittsburg, Pa.
Pittsburg, Cincinnati & St. Louis	S. M. Felton, Jr.	William Mullins	Pittsburg, Pa.
Pittsburg, Cincinnati & St. Louis	*D. W. Caldwell		Pittsburg, Pa.
Pitts., Cin. & St. Louis Div	J. H. Barrett		Columbus, O.
Col., Cin. & Ind., Cent. Div	J. H Hill		Pittsburg, Pa.
Col., Cin. & Ind., Cent. Div	J. F. Miller		Logansport, Ind.
Indianap. & Vincennes Div	E. W. McKenna		Richmond, Ind.
Cincin. & Musk. Valley Div	C. C. Waite		Indianapolis, Ind.
Littl. Miami Div	J. D. Ellison		Zanesville, O.
Pittsburg, Ft. Wayne & Chicago	*J. D. Layng	William Mullins	Cincinnati, O.
Pittsburg, Ft. Wayne & Chicago	C. E. Gorham		Pittsburg, Pa.
Eastern Division	George S. Griscom		Chicago, Ill.
Western Division	C. D. Gorham		Pittsburg, Pa.
Pittsburg & Western	G. A. Woerth		Fort Wayne, Ind.
Pittsburg, Titusville & Buffalo	Theo. H. Wilson		Harmony, Pa.
Pittsburg, Titusville & Buffalo		John L. Awl	Oil City, Pa.
Pittsburg, Virginia & Charleston	J. M. Byers		Pittsburg, Pa.
Port Dover & Lake Huron	A. B. Atwater		Pittsburg, Pa.
Port Royal & Augusta	R. G. Fleming		Woodstock, Ont.
Portland & Ogdensburg	Jonas Hamilton	Jonas Hamilton	Port Royal, S. C.
Portland & Rochester	J. M. Lunt	J. M. Lunt	Portland, Me.
Potomac, Fredericksb'h & Pied't	Charles Kennedy		Portland, Me.
Poughkeepsie, Hartford & Boston	J. A. Perkins	A. W. Cable	Fredericksb'h, Va.
Prince Edward Island	Alex. McNabb	Alex. McNabb	Poughkeepsie, N.Y.
Prospect Park & Coney Island	R. Schermerhorn		Charlotte'n, P.E.I.
Providence & Springfield	William Tinkham	William Tinkham	Coney Island, N.Y.
Providence & Worcester	W. E. Chamberlain		Providence, R. I.
Providence, Warren & Bristol	Waterman Stone		Providence, R. I.
Q			
Quebec, Mont., Ott'a & Occidental	C. A. Scott	Jas. Macpherson	Montreal, Can.
Quebec Central	§A. Steele		Sherbrooke, Can.
Queen Anne & Kent County	P. H. Irwin		Centreville, Md.
Quincy, Missouri & Pacific	F. D. Schermerhorn		Quincy, Ill.
R			
Raleigh & Augusta Air-Line	J. C. Winder		Raleigh, N. C.
Raleigh & Gaston	J. C. Winder		Raleigh, N. C.
Rhinebeck & Connecticut	J. H. Jones		Rondout, N. Y.
Richmond, York Riv. & Chesap'ke	H. T. Douglas	B. S. Crouch	Richmond, Va.
Richmond & Danville	(See Piedmont Air-Line)		
Richmond, Frederick'b & Potomac	E. T. D. Myers	T. L. Courtney	Richmond, Va.
Richmond & Petersburg	Theo. D. Kline		Richmond, Va.
Rio Grande	*M. J. Gomila		Brownzsville, Tex.
Rochester & State Line	E. E. Childs	J. E. Childs	Rochester, N. Y.
Rockwood & Tennessee River	H. Clay Evans		Rockwood, Tenn.
Rock Island & Mercer County	*R. R. Cable		Rock Island, Ill.
Rock Island & Peoria	R. R. Cable	R. R. Cable	Rock Island, Ill.
Rome	Eben Hillyer		Rome, Ga.
Rome, Watertown & Ogdensburg	E. A. Van Horne		Watertown, N. Y.
Rome, Watertown & Ogdensburg		G. W. B. Cushing	New York City.
Rumford & Buckfield	O. Hayford		Canton, Me.
S			
Scioto Valley	*H. L. Morrill		Columbus, O.
Scioto Valley	J. B. Peters	J. B. Peters	Columbus, O.
St. Croix & Penobscot	Wallace Haycock		Milltown, Me.
St. Lawrence & Ottawa	*Tho. Reynolds	Tho. Reynolds	Ottawa Can.
St. Johns	R. McLaughlin		St. Augustine, Fla.
St. Johns & Indian River	W. H. Churchill		Titusville, Fla.
St. John & Maine	H. D. McLeod		St. John, N. B.
St. Joseph & Western	L. D. Tuthill		St. Joseph, Mo.
St. Joseph & Western		A. D. Clarke	Omaha, Neb.
St. Louis, Alton & Terre Haute	Beriah Warren	Beriah Warren	St. Louis, Mo.
St. Louis, Hannibal & Keokuk	W. W. Walker		Hannibal, Mo.
St. Louis, Iron Mountain & South	Arthur W. Soper	W. S. Cuddy	St. Louis, Mo.
Texas Division	J. W. Brown		Texarkana, Texas
St. Louis & San Francisco	*C. W. Rogers	C. W. Rogers	St. Louis, Mo.
Kansas Division	W. A. Thoms		Oswego, Kan.
St. Louis, Keokuk & Northwest'n	A. L. Griffin	John A. Blood	Keokuk, Ia.
St. Louis, Salem & Little Rock	E. B. Sankey		Salem, Mo.
St. Louis, Salem & Little Rock		H. A. Crawford	St. Louis, Mo.
St. Paul & Duluth	Geo. H. Smith		St. Paul, Minn.
St. Paul, Minneapolis & Manitoba	*Jas. J. Hill	J. C. Morrison	St. Paul, Minn.
St. Paul, Minneapolis & Manitoba	E. B. Wakeman		St. Paul, Minn.
St. Paul & Sioux City	J. F. Lincoln	J. F. Lincoln	St. Paul, Minn.
St. Paul, Stillwater & Taylor's Falls	J. B. Stickney		St. Paul, Minn.
Sacramento & Placerville	Josiah Johnson		Sacramento, Cal.
Saginaw Valley & St. Louis	N. W. Merrill	N. W. Merrill	Saginaw, Mich.
San Francisco & North Pacific	*A. Hughes	A. Hughes	San Francisco, Cal.
San Francisco & North Pacific	A. A. Bean	P. E. Dougherty	Petaluma, Cal.
San Rafael & San Quentin	David Nye		San Rafael, Cal.
Savannah, Florida & Western	H. S. Haines	W. B. McKee	Savannah, Ga.
Savannah & Charleston	C. S. Gadelen		Charleston, S. C.
Savannah & Memphis	W. S. Greene	W. S. Greene	Opelika, Ala.
Seaboard & Roanoke	J. M. Robinson	J. A. Walton	Baltimore, Md.
Selma & Greensboro	E. W. Rucker	E. W. Rucker	Marion, Ala.
Selma, Rome & Dalton	Norman Webb	Norman Webb	Selma, Ala.
Sheboygan & Fond du Lac	E. J. Cuyler		Fond du Lac, Wis.
Shenango & Allegheny	J. T. Blair		Greenville, Pa.
Shepaug	C. H. Platt		Litchfield, Conn.
Sioux City & Dakota	Geo. E. Merchant	Geo. E. Merchant	Sioux City, Ia.
Sioux City & Pacific	F. C. Hills		Missouri Valley, Ia.
Sioux City & Pacific	*P. E. Hall	P. E. Hall	Cedar Rapids, Ia.
Skaneateles	J. McNamara		Skaneateles, N. Y.
South Carolina	John F. Peck	S. B. Pickens	Charleston, S. C.
Southeastern of Canada	H. A. Alden		Newport, Vt.
Southern Central	Jas. G. Knapp		Auburn, N. Y.
Southern Minnesota	J. M. Egan	J. M. Egan	La Crosse, Wis.
Mankato Division			Mankato, Minn.
South Mountain	W. H. Woodward		Pine Grove Furnace, Pa.
Southern Pacific	A. C. Bassett	John R. Watson	San Francisco, Cal.
Los Angeles & Yuma Div	§E. E. Hewitt		Los Angeles, Cal.
Tulare Division	E. C. Fellows		Oakland, Cal.
South Pacific Coast	Thomas Carter	DeLancey Stone	San Francisco, Cal.
Southwestern of Georgia	W. G. Raoul		Macon, Ga.
Southwestern of Kentucky	M. Tabler		Harrodsburg, Ky.
Spartanburg, Union & Columbia	Jas. Anderson	*Jas. Anderson	Spartanburg, S. C.
Spartanburg & Asheville	Jas. Anderson	Jas Anderson	Spartanburg, S. C.
Springfield, Athol & Northeastern	John W. Phelps		Springfield, Mass.
Springfield & Northwestern	*Geo. N. Black	J. A. Williams	Springfield, Ill.
Springfield Southern	Wm. Thornburg	G. A. Barnes	Springfield, O.
Springfield & Western Missouri	T. F. Oakes		Kansas City, Mo.
Springhill & Parsboro	J. A. Killam		Parsboro, N. S.
State Line & Sullivan	J. O. Blight		Towanda, Pa.
Staten Island	John W. Wilber		Tottenville, N. Y.
Sterling Mountain	J. C. Missimer		Sloatsburg, N. Y.
Stonington & Providence	J. B. Gardiner		Providence, R. I.
Stonington & Providence		Giles F. Ward	Stonington, Conn.
Summit Branch	R. C. Peebles		Lykens, Pa.
Summit County	W. M. Ritter		Coalville, Utah.
Sussex	E. C. Case	E. C. Case	Newtown, N. J.
Syracuse, Binghamton & N. Y.	W. K. Niver		Syracuse, N. Y.
Syracuse, Binghamton & N. Y.		G. W. B. Cushing	New York, N. Y.
Syracuse, Chenango & New York	A. C. Belden		Syracuse, N. Y.
Syracuse, Geneva & Corning	A. H. Gorton		Corning, N. Y.

Railroad.	Superintendent.	Purchasing Agent.	Residence.
T			
Tennessee & Pacific	J. W. Thomas		Nashville, Tenn.
Terre Haute & Ind'apolis } Van-	*John E. Simpson		St. Louis, Mo.
Terre Haute & Ind'apolis } dalia	Joshua Staples		Indianapolis, Ind.
Terre Haute & Ind'apolis } Line.		C. R. Peddle	Terre Haute, Ind.
Logansport Division			Logansport, Ind.
Terre Haute & Southeastern	George Atherton		Terre Haute, Ind.
Texas & New Orleans	C. A. Burton	P. B. Watson	Houston, Tex.
Texas & Pacific	Geo. Noble	Geo. Noble	Marshall, Tex.
Jefferson Division	J. S. Noble		Texarkana, Tex.
Southern Division	C. Harris		Marshall, Tex.
Texas Western	J. W. Goodwin		Houston, Tex.
Tioga & Elmira State Line	L. H. Shattuck		Blossburg, Pa.
Toledo, Delphos & Burlington	J. H. Burgoon		Delphos, O.
Toledo & Ann Arbor	J. S. Morris		Ann Arbor, Mich.
Toledo, Peoria & Western	W. F. Merrill	W. F. Merrill	Peoria, Ill.
Troy & Boston	E. E. Aldrich	D. Robinson	Troy, N. Y.
Toronto, Grey & Bruce	*Edmund Wragge	W. Watson	Toronto, Can.
Toronto & Nipissing	John Duncan	John Lymons	Toronto, Can.
Tuckerton	J. J. Pharo	J. C. Ridgeway	Tuckerton, N. J.
U			
Ulster & Delaware	Geo. Coykendall		Rondout, N. Y.
Union Pacific	*S. H. H. Clarke	A. D. Clark	Omaha, Neb.
Union Pacific	*Jas. T. Clarke		Omaha, Neb.
Eastern Division	P. J. Nichols		Omaha, Neb.
Western Division	W. B. Doddridge		Evanston, Wy. T.
Mountain Division	Robert Law		Cheyenne, Wy. T.
Laramie Division	Edw. Dickinson		Laramie, Wy. T.
Colorado Division	A. A. Egbert		Denver, Col.
Union Railway & Transit Co	J. B. Van Dyne	E. J. Williams, Jr.	St. Louis, Mo.
Union R. R. Trans. & S. Yard Co	*M. A. Downing	**Albert Scott	Indianapolis, Ind.
Utah Central	John Sharp	S. H. Hill	Salt Lake City.
Utah Northern	Geo. W. Thatcher		Logan, Utah.
Utah Western	*W. W. Riter	W. W. Riter	Salt Lake City.
Utica & Black River	J. F. Maynard		Utica, N. Y.
Utica, Ithaca & Elmira	Geo. J. Rice	J. L. Greatsinger	Horse Heads, N. Y.
V			
Vicksburg & Brunswick	W. G. Raoul		Macon, Ga.
Vermont Valley	John Mulligan		Springfield, Mass.
Vicksburg & Meridian	E. F. Raworth	E. F. Raworth	Vicksburg, Miss.
Vicksburg, Shreveport & Pacific	*J. W. Green	J. W. Green	Monroe, La.
Virginia & Truckee	H. M. Yerington	C. P. Mason	Carson, Nev.
W			
Wabash, St. Louis & Pacific	*John C. Gault		St. Louis, Mo.
Eastern Division	R. Andrews		Toledo, O.
Western Division	Thos. McKisock	R. W. Green	St. Louis, Mo.
Illinois Division	H. F. Clark		Springfield, Ill.
Ohio & Indiana Division	K. H. Wade		Fort Wayne, Ind.
Wabash, Chester & Western	J. L. Hinkley		Chester, Ill.
Wallkill Valley	J. H. Jones		Rondout, N. Y.
Washington & Ohio	R. H. Havener	Lewis McKenzie	Alexandria, Va.
Wash. City, Va. Mid. & G. South'n	Peyton Randolph		Alexandria, Va.
Waukon & Mississippi	F. O. Wyatt		Dubuque, Ia.
Waynesburg & Washington	Jacob Swart		Waynesburg, Pa.
Welland	William Fay		St. Catherine, Ont.
Westchester & Philadelphia	Henry K. Smith	J. J. Bryant	Philadelphia, Pa.
West Feliciana	J. B. McGehee		Laurel Hill, La.
West Jersey	W. J. Sewell		Camden, N. J.
Western of Alabama	*Cecil Gabbett	Cecil Gabbett	Montgomery, Ala.
Western of North Carolina	L. C. Jones		Fayetteville, N. C.
Western & Atlantic	Wm. McRae	W. R. Webster	Atlanta, Ga.
Western Maryland	*J. M. Hood		Baltimore, Md.
Western North Carolina	J. W. Wilson	J. W. Wilson	Morganton, N. C.
Whitewater	W. W. Worthington		Ft. Wayne, Ind.
Whitby, Port Perry & Lindsay	*Jas. Holden		Whitby, Ont.
Wicomoco & Pocomoke	H. B. Pitts		Berlin, Md.
Williamstown	J. F. Bodine		Williamstown, N. J.
Wilmington, Columbia & Augusta	J. F. Divine	J. F. Divine	Wilmington, N. C.
Wilmington & Northern	J. H. Thompson		Coatesville, Pa.
Wilmington & Weldon	J. F. Divine	J. F. Divine	Wilmington, N. C.
Windsor & Annapolis	*P. Innes		Kentville, N. S.
Wisconsin Central	*F. N. Finney	J. W. Curtiss	Milwaukee, Wis.
Mil. & Eastern Div	C. F. Dutton		Milwaukee, Wis.
So. Mid. & Northern	G. Campbell		Steven's Point, Wis.
Wisconsin Valley	F. O. Wyatt		Tomah, Wis.
Woodstock	J. G. Porter		Woodstock, Vt.
Worcester & Nashua	C. S. Turner	C. S. Turner	Worcester, Mass.
Worcester & Shrewsbury	J. F. Bigelow		Worcester, Mass.
Worcester & Somerset	F. J. Palster		Philadelphia, Pa.
Y			
Youghiogheny	Wm. Wilson		Irwin's, Pa.



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CAR AND WHEEL WORKS,
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Manufacturers of Cars and CAR WHEELS of all descriptions. Wheels and Axles, Chilled Tires; Engine, Car and Bridge Castings, of any pattern, furnished to order at short notice. Wheels of all sizes constantly on hand.

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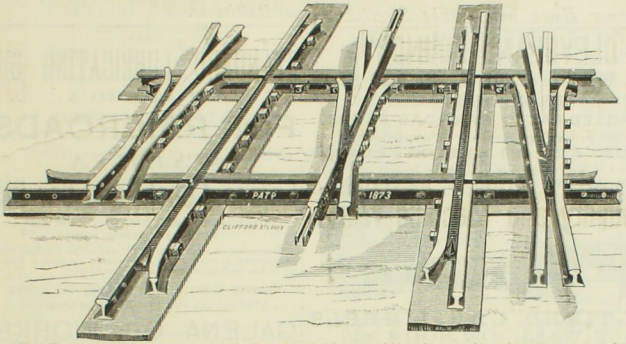
WORKS: Eastern Avenue and Lewis Street
L. A. GREEN, Ass't Sup't, Cincinnati, O.

ELLIOT'S PATENT STEEL RAIL FROGS AND CROSSINGS.

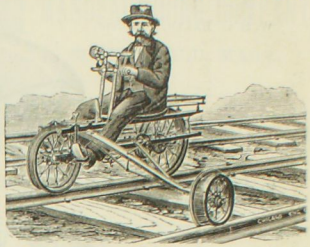
Frogs and Crossings made any angle desired. Rail from 30 to 62 lbs. per yard.



These Frogs and Crossings are made of steel rail, combined with a wrought-iron frame, and bound together transversely with strong bolts, which gives it great strength and durability without destroying its elasticity. They are connected at all ends by Fish-Plate Joints, and lie on the same tie surface as the running rail without any cutting of ties, thus saving a great deal of time and labor in putting in place in track.

Manufactured by H. & H. ELLIOT, East St. Louis, Ill.

The Sheffield Velocipede Hand-Car.



This Hand-Car is especially adapted to the use of **Road-Masters, Bridge Inspectors, Telegraph Line Repairers, Track Superiors, Track Walkers, Wood and Tie Inspectors,** and for all work where one or two men wish to go over the line at will.

It is Light, Easily Handled, and when ready for shipment occupies very little space in Baggage Car—a great advantage to railroad men.

It runs easily, being propelled by the **ROWING MOVEMENT.** Can be run short distances at the rate of **20 Miles an hour; and will not jump the track.**

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SCHLENKER'S
Stationary-Die and Revolving-Die
BOLT CUTTERS
THE BEST AND CHEAPEST MADE.
HOWARD IRON WORKS,
Buffalo, N. Y.
Send for Catalogue.

THE NEW IRON ORE PAINT,

Manuf'd by the CLEVELAND IRON ORE PAINT CO.

These Paints are made from carefully selected IRON ORE, of superior quality and color, and by means of IMPROVED MACHINERY a degree of FINENESS and covering capacity has been obtained which FAR EXCEEDS that of any other Iron Paint ever before offered.

Analysis shows a larger per centage of real Iron than any other Paint.

Analysis by Prof. E. W. MORLEY, Western Reserve College, Hudson, O.

HUDSON, December 5, 1878.

To Cleveland Iron Ore Paint Co.

GENTLEMEN—I have just completed an analysis of two samples of Iron Ore Paint from your Company, and find them to consist wholly of Iron Ore reduced to a fine powder. One of them is made of an Ore which contains very little but Sesqui-Oxide of Iron, and is somewhat calcareous. The following is the composition in parts in a hundred:

	RED PAINT.	PURPLE PAINT.
Sesqui-Oxide of Iron,	65.80	96.56
Insoluble Siliceous Residue,	21.90	3.39
Lime,	5.71	.00
Magnesia,	2.95	.00
Carbonic Acid, Sulphur, Phosphorus, &c.,	3.64	0.05
	100.00	100.00
Metallic Iron,	46.06 per cent.	67.59 per cent.

Very Truly Yours

(Signed) Edw. W. Morley.

Send for samples before buying any other.

CLEVELAND IRON ORE PAINT CO.,

BINGHAM, PRICE & MORLEY, Proprietors, CLEVELAND, OHIO.